



4 Risk Assessment

Requirement §201.6(c)(2): [The plan shall include] A risk assessment that provides the factual basis for activities proposed in the strategy to reduce losses from identified hazards. local risk assessments must provide sufficient information to enable the jurisdiction to identify and prioritize appropriate mitigation actions to reduce losses from identified hazards.

As defined by the Federal Emergency Management Agency (FEMA), risk is a combination of hazard, vulnerability, and exposure. “It is the impact that a hazard would have on people, services, facilities, and structures in a community and refers to the likelihood of a hazard event resulting in an adverse condition that causes injury or damage.”

The risk assessment process identifies and profiles relevant hazards and assesses the exposure of lives, property, and infrastructure to these hazards. The process allows for a better understanding of a jurisdiction’s potential risk to natural hazards and provides a framework for developing and prioritizing mitigation actions to reduce risk from future hazard events.

This risk assessment followed the methodology described in the FEMA publication *Understanding Your Risks—Identifying Hazards and Estimating Losses* (FEMA 386-2, 2002), which breaks the assessment down to a four-step process:

- 1) Identify Hazards;
- 2) Profile Hazard Events;
- 3) Inventory Assets; and
- 4) Estimate Losses.

Data collected through this process has been incorporated into the following sections of this chapter:

- **Section 4.1: Hazard Identification: Natural Hazards** identifies the natural hazards that threaten the planning area and describes why some hazards have been omitted from further consideration.
- **Section 4.2: Hazard Profiles** discusses the threat to the planning area and describes previous occurrences of hazard events and the likelihood of future occurrences.
- **Section 4.3: Vulnerability Assessment** assesses the Planning Areas’ exposure to natural hazards; considering assets at risk, critical facilities, and future development trends.
- **Section 4.4: Capability Assessment** inventories existing mitigation activities and policies, regulations, and plans that pertain to mitigation and can affect net vulnerability.

Note: The examination of capability assessment is not required by FEMA.

This risk assessment covers the entire geographical extent of Placer County, including the incorporated communities and other participating jurisdictions. Since this plan is a multi-jurisdictional plan, the Hazard Mitigation Planning Committee (HMPC) is required to evaluate how the hazards and risks vary from jurisdiction to jurisdiction. While these differences are noted in this chapter, they are expanded upon in the annexes of the participating jurisdictions. If no additional data is provided in an annex, it should be assumed that the risk and potential impacts to the affected jurisdiction are similar to those described here for the entire Placer County planning area.

4.1 Hazard Identification: Natural Hazards

Requirement §201.6(c)(2)(i): [The risk assessment shall include a] description of the type...of all natural hazards that can affect the jurisdiction.

The Placer County HMPC conducted a hazard identification study to determine the hazards that threaten the planning area.

4.1.1 Results and Methodology

Using existing natural hazards data and input gained through planning meetings, the HMPC agreed upon a list of natural hazards that could affect Placer County. Hazards data from the California Emergency Management Agency (CAL EMA), FEMA, the National Oceanic and Atmospheric Administration (NOAA), and many other sources were examined to assess the significance of these hazards to the planning area. Significance was measured in general terms and focused on key criteria such as frequency and resulting damage, which includes deaths and injuries, as well as property and economic damage. The natural hazards evaluated as part of this plan include those that have occurred historically or have the potential to cause significant human and/or monetary losses in the future. Only the more significant (or priority) hazards have a more detailed hazard profile and are analyzed further in Section 4.3 Vulnerability Assessment.

In alphabetical order, the natural hazards identified and investigated for the Placer County Local Hazard Mitigation Plan include:

- Agricultural
- Avalanche
- Dam Failure
- Drought
- Earthquake
- Flood
- Human Health Hazards
 - Epidemic/Pandemic
 - West Nile Virus
- Landslide

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- Severe Weather
 - Extreme Temperatures
 - Fog
 - Heavy Rain/Thunderstorm/Hail/Lightning/Wind
 - Snow
 - Tornado
 - Seiche (Lake Tsunami)
 - Soil Hazards
 - Erosion
 - Expansive Soils
 - Volcano
 - Wildfire

The HMPC eliminated the natural hazards listed below from further consideration in this risk assessment because they either occur rarely or not at all in Placer County, and when they do occur they are very limited in magnitude—no or very limited damage is sustained.

- Coastal Erosion
- Coastal Storm
- Soil Hazards: Subsidence
- Hurricane
- Tsunami (Ocean)

4.1.2 Disaster Declaration History

One method the HMPC used to identify hazards was the researching of past events that triggered federal and/or state emergency or disaster declarations in the planning area. Federal and/or state disaster declarations may be granted when the severity and magnitude of an event surpasses the ability of the local government to respond and recover. Disaster assistance is supplemental and sequential. When the local government's capacity has been surpassed, a state disaster declaration may be issued, allowing for the provision of state assistance. Should the disaster be so severe that both the local and state governments' capacities are exceeded, a federal emergency or disaster declaration may be issued allowing for the provision of federal assistance.

The federal government may issue a disaster declaration through FEMA, the U.S. Department of Agriculture (USDA), and/or the Small Business Administration (SBA). FEMA also issues emergency declarations, which are more limited in scope and without the long-term federal recovery programs of major disaster declarations. The quantity and types of damage are the determining factors.

A USDA declaration will result in the implementation of the Emergency Loan Program through the Farm Services Agency. This program enables eligible farmers and ranchers in the affected

county as well as contiguous counties to apply for low interest loans. A USDA declaration will automatically follow a major disaster declaration for counties designated major disaster areas and those that are contiguous to declared counties, including those that are across state lines. As part of an agreement with the USDA, the SBA offers low interest loans for eligible businesses that suffer economic losses in declared and contiguous counties that have been declared by the USDA. These loans are referred to as Economic Injury Disaster Loans.

Based on the disaster declaration history provided in Table 4.1, Placer County is among the many counties in California susceptible to disaster. Details on federal and state disaster declarations were obtained by the HMPC, FEMA, and CAL EMA and compiled in chronological order in Table 4.1. A review of state and federal declared disasters indicates that Placer County received 27 state declarations between 1950 and January 2008, 16 of which also received federal disaster declarations. Of the 27 state declarations: 20 were associated with severe winter storms, heavy rains, or flooding; 1 was for freeze and severe weather conditions; 2 were for wildfire; and 1 was for fires and explosions on the Southern Pacific Railroad. USDA and SBA declarations for the planning area are discussed in Section 4.2.7 Agricultural Hazards.

This disaster history (combined FEMA and state) suggests that Placer County experiences a major event worthy of a disaster declaration every 2.2 years. The County has a 46.6 percent chance of receiving a disaster declaration in any given year. With the exception of the declarations for wildfire and the railroad fires, every other declaration (21 total) resulted directly or indirectly from severe weather. Similarly, most disaster-related injuries to people and damage to property and crops resulted from severe weather conditions.

Table 4.1. Placer County State and Federal Disasters Declaration, 1950-2008

Hazard Type	Disaster #	Year	State Declaration	Federal Declaration	Location	Damage*
Floods	CDO 50-01	1950	11/21/50	N/A	Placer County (statewide)	9 deaths; \$32,183,000
Floods	DR-47	1955	12/22/55	12/23/55	Placer County (statewide)	74 deaths; \$200,000,000
Unseasonal and Heavy Rainfall	N/A	1957	5/20/57 (cherry-producing)	N/A	Placer County (other cherry-producing areas)	2 injuries; \$6,000,000
Storm & Flood Damage	CDO 58-03	1958	2/26/58	N/A	Placer County (northern California)	N/A
Storm & Flood Damage	N/A	1958	4/02/58	4/4/58	Placer County (statewide)	13 deaths \$24,000,000
Widespread Fires	N/A	1961	9/08/61	N/A	Placer County (and 8 other counties)	\$5,696,813
Flood and Rainstorms	138	1962	10/25/62	10/24/62	Placer County (and 11 other counties)	\$4,000,000+

Hazard Type	Disaster #	Year	State Declaration	Federal Declaration	Location	Damage*
Abnormally Heavy and Continuous Rainfall	N/A	1963	2/14/64	N/A	Placer County (and 50 other counties)	N/A
Flood and Rainstorms	145	1963	2/07/63	2/25/63	Placer County (and 20 other counties)	N/A
Late Winter Storms	OEP 183-DR-CA	1964/1965	12/28/64	12/29/64	Placer County (and 25 other counties)	\$213,149,000
Major and Widespread Fires	N/A	1965	9/18/65	N/A	Placer County (and 4 other counties)	113,766 acres and 41 buildings destroyed
1969 Storms	OEP 253-DR-CA	1969	1/28/69	1/26/69	Placer County (and 39 other counties)	47 deaths; 161 injuries; \$300,000,000
Freeze and Severe Weather Conditions	N/A	1972	4/17/72	N/A	Placer County (and 16 other counties)	\$111,517,260
Storms and Floods	N/A	1973	2/08/73	N/A	Placer County (and 5 other counties)	\$1,864,000
Southern Pacific Railroad Fires and Explosions	N/A	1973	4/30/73	N/A	Placer County (and 1 other county)	37 injuries; \$2,925,000
Winter Storms	DR-682	1982/1983	3/15/83	2/9/83	Placer County (and 43 other counties)	\$523,617,032
Storms	DR-758	1986	2/20/86	2/18/86	Placer County (and 38 other counties)	13 deaths; 67 injuries; \$407,538,904
Wildland Fires	N/A	1987	9/03/87	N/A	Placer County (and 23 other counties)	3 deaths; 76 injuries; \$18,000,000
Severe Winter Storms	DR-1044	1995	1/10/95	1/13/95	Placer County (and 44 other counties)	11 deaths; \$741,400,000
Late Winter Storms	DR-1046	1995	N/A	1/10/95	Placer County (and all other counties except Del Norte)	17 deaths; \$1,100,000,000
January 1997 Floods	DR-1155	1997	1/03/97	1/04/07	Placer County (and 47 other counties)	8 deaths; \$1,800,000,000
Energy Emergency	GP-2001	2001	1/1/01	N/A	Placer County (and all 57 other counties)	N/A
Sierra Fire	FM-2463	2002		9/19/02	Placer County	\$720,595
Stevens Fire	FM-2541	2004		8/8/04	Placer County	\$3,469,004

Hazard Type	Disaster #	Year	State Declaration	Federal Declaration	Location	Damage*
Hurricane Katrina Evacuations: Economic	EM-3248	2005		9/13/05	Placer County (and all 57 other counties)	\$763,576
Severe Rainstorms, Flooding, Landslides, and Mudslides	DR-1628	2005/2006	1/03/06	2/03/06	Placer County (and 33 other counties)	N/A
Severe Storms, Flooding, Landslides, and Mudslides	DR-1646	2006	4/10/06	6/05/06	Placer County (and 18 other counties)	N/A
Extreme Winds and Heavy Rains	N/A	2008	1/07/08	N/A	Placer County (and 12 other counties)	N/A

Source: California Emergency Management Agency, www.oes.ca.gov

And FEMA, http://www.fema.gov/news/disasters_state.fema?id=6

*Note: Damage amount and deaths and injuries reflect totals for all impacted counties

4.2 Hazard Profiles

Requirement §201.6(c)(2)(i): [The risk assessment shall include a] description of the...location and extent of all natural hazards that can affect the jurisdiction. The plan shall include information on previous occurrences of hazard events and on the probability of future hazard events.

The hazards identified in Section 4.1 Hazard Identification: Natural Hazards, are profiled individually in this section. In general, information provided by planning team members is integrated into this section with information from other data sources. These profiles set the stage for Section 4.3 Vulnerability Assessment, where the vulnerability is quantified for each of the priority hazards.

Each hazard is profiled in the following format:

- **Hazard/Problem Description**—This section gives a description of the hazard and associated issues followed by details on the hazard specific to the Placer County planning area. Where known, this includes information on the hazard extent, seasonal patterns, speed of onset/duration, and magnitude and/or any secondary effects.
- **Past Occurrences**—This section contains information on historical incidents, including impacts where known. The extent or location of the hazard within or near the Placer County planning area is also included here. Historical incident worksheets were used to capture information from participating jurisdictions on past occurrences.
- **Frequency/Likelihood of Future Occurrence**—The frequency of past events is used in this section to gauge the likelihood of future occurrences. Where possible, frequency was calculated based on existing data. It was determined by dividing the number of events observed by the number of years on record and multiplying by 100. This gives the percent

chance of the event happening in any given year (e.g., three droughts over a 30-year period equates to a 10 percent chance of a experiencing a drought in any given year). The likelihood of future occurrences is categorized into one of the following classifications:

- **Highly Likely**—Near 100 percent chance of occurrence in next year or happens every year
- **Likely**—Between 10 and 100 percent chance of occurrence in next year or has a recurrence interval of 10 years or less
- **Occasional**—Between 1 and 10 percent chance of occurrence in the next year or has a recurrence interval of 11 to 100 years
- **Unlikely**—Less than 1 percent chance of occurrence in next 100 years or has a recurrence interval of greater than every 100 years.

Section 4.2.21 Natural Hazards Summary, provides an initial assessment of the profiles and assigns a level of significance or priority to each hazard. Those hazards determined to be of high significance were characterized as priority hazards that required further evaluation in Section 4.3 Vulnerability Assessment. Those hazards that occur infrequently or have little or no impact on the planning area were determined to be of low significance and not considered a priority hazard. Significance was determined based on the hazard profile, focusing on key criteria such as frequency and resulting damage, including deaths/injuries and property, crop, and economic damage. This assessment was used by the HMPC to prioritize those hazards of greatest significance to the planning area, enabling the County to focus resources where they are most needed.

The following sections provide profiles of the natural hazards that the HMPC identified in Section 4.1 Hazard Identification. The severe weather hazards are discussed first because it is the secondary hazards generated by severe weather (e.g., flood and wildfire) that can result in the most significant losses. The other hazards follow alphabetically.

4.2.1 Severe Weather: General

Severe weather is generally any destructive weather event, but usually occurs in the Placer County planning area as localized storms that bring heavy rain, hail, lightning, and strong winds.

The National Oceanic and Atmospheric Administration's National Climatic Data Center (NCDC) has been tracking severe weather since 1950. Their Storm Events Database contains data on the following: all weather events from 1993 to current (except from 6/1993-7/1993); and additional data from the Storm Prediction Center, which includes tornadoes (1950-1992), thunderstorm winds (1955-1992), and hail (1955-1992). This database contains 32 severe weather events that occurred in Placer County between January 1, 1950, and December 31, 2007. Table 4.2 summarizes these events.

Table 4.2. NCDC Severe Weather Reports for Placer County, 1950-2007*

Type	# of Events	Property Loss (\$)	Crop Loss (\$)	Deaths	Injuries
Flash Floods	3	150,000	0	0	0
Floods	2	3,000,000	0	0	0
Hail	4	0	0	0	0
Heavy Rain	14	10,000	0	2	0
Thunderstorm/Wind	2	0	0	0	0
Thunderstorm/Wind/Hail	2	1,000	0	0	0
Tornado: F0	3	3,000	0	0	0
Tornado: F1	1	250,000	0	0	0
Waterspout	1	0	0	0	0
Totals	32	3,414,000	0	2	0

Source: National Climatic Data Center Storm Events Database, www4.ncdc.noaa.gov/cgi-win/wwwcgi.dll?wwEvent~Storms

*Note: Losses reflect totals for all impacted areas

The HMPC supplemented NCDC data with data from SHELDUS (Spatial Hazard Events and Losses Database for the United States). SHELDUS is a county-level data set for the United States that tracks 18 types of natural hazard events along with associated property and crop losses, injuries, and fatalities for the period 1960-2005. Produced by the Hazards Research Lab at the University of South Carolina, this database combines information from several sources (including the NCDC). From 1960 to 1995, only those events that generated more than \$50,000 in damage were included in the database. For events that covered multiple counties, the dollar losses, deaths, and injuries were equally divided among the affected counties (e.g., if four counties were affected, then a quarter of the dollar losses, injuries, and deaths were attributed to each county). From 1995 to 2005 all events that were reported by the NCDC with a specific dollar amount are included in SHELDUS.

SHELDUS contains information on 201 severe weather events that occurred in Placer County between 1960 and 2005. Table 4.3 summarizes these events.

Table 4.3. SHELDUS Severe Weather Reports for Placer County, 1960-2005*

Type	# of Events	Property Loss (\$)	Crop Loss (\$)	Deaths	Injuries
Drought	1	86,207	8,620,690	.05	0
Earthquake	1	50,000	0	2	32
Flooding	13	33,296,405	189,605,958	23.38	226.14
Flooding, Severe Storm, Thunderstorm	2	66,250	13,000,000	0	0
Flooding, Wind	1	0	11,241,379	0	0
Flooding, Wind, Winter Weather	1	0	21,000,000	0	0

Type	# of Events	Property Loss (\$)	Crop Loss (\$)	Deaths	Injuries
Flooding, Winter Weather	2	96,166,667	5,000,000	0.5	0
Fog	16	1,102,500	0	6.17	98.86
Hail	17	2,437,084	86,454,282	0.78	5.17
Hail, Severe Storm, Thunderstorm	1	50,000	0	0	0
Hail, Wind	1	5,000	0	0	0
Heat	4	1,316	7,700,000	0.18	0
Landslide	2	0	22,100,000	0	0
Lightning	8	169,404	28,676	1.06	1.33
Lightning, Wind, Winter Weather	1	20,000	0	0	0
Severe Storm, Thunderstorm	23	6,883,517	2,492,779	2.48	2.32
Severe Storm, Thunderstorm, Wind	21	1,103,636	58,892,468	0.02	20.1
Severe Storm, Thunderstorm, Winter Weather	1	5,000	0	0	0
Tornado	9	2,536,086	20,862	0.2	0
Wildfire	9	1,531,730	438	0.16	0.34
Wind	41	38,736,053	188,412	1.91	27.82
Winter Weather	26	73,000	26,311,400	0	3.86
Totals	201	184,372,355	452,767,760	32.89	328.08

Source: SHEL DUS, Hazards Research Lab, University of South Carolina, www.sheldus.org/

*Events may have occurred over multiple counties, so damage may represent only a fraction of the total event damage and may be not specific to Placer County

The NCDC and SHEL DUS tables above summarize severe weather events that occurred in Placer County. Only a few of the events actually resulted in state and federal disaster declarations. It is further interesting to note that different data sources capture different events during the same time period, and often display different information specific to the same events. While the HMPC recognizes these inconsistencies, they see the value this data provides in depicting the County's "big picture" hazard environment.

As previously mentioned, most all of Placer County's state and federal disaster declarations have been a result of severe weather. For this plan, severe weather is discussed in the following subsections:

- Extreme Temperatures (Extreme Cold/Freeze and Extreme Heat)
- Fog
- Heavy Rain/Thunderstorm/Hail/Lightning/Wind
- Snow
- Tornado

Due to size of the County and changes in elevation (i.e., from approximately 100 feet to more than 9,000 feet above msl) and climate, weather conditions can vary greatly across the County. For purposes of this hazard profile, the County will be divided into two distinct sections, as applicable: western Placer County, which is predominantly below an elevation of 4,000 feet above msl, is generally below the snowfall line, and includes the community of Foresthill and all land to the west (including all incorporated cities and towns); and eastern Placer County, which is generally above 4,000 feet above msl, receives snowfall, and includes all of the County east of Foresthill. The profiles that follow provide information, where possible, from two weather stations located in these two different parts of the County: Auburn (elevation: 1290 feet above msl) in west Placer County and Tahoe (elevation: 6,230 feet above msl), in east Placer County.

4.2.2 Severe Weather: Extreme Temperatures

Hazard/Problem Description

Extreme temperature events, both cold and hot, can have severe impacts on human health and mortality and natural ecosystems as well as agriculture and other economic sectors.

Extreme Cold/Freeze

Extreme cold often accompanies a winter storm or is left in its wake. Prolonged exposure to cold can cause frostbite or hypothermia and can be life-threatening. Infants and the elderly are most susceptible. Pipes may freeze and burst in homes or buildings that are poorly insulated or without heat. Freezing temperatures can cause significant damage to the agricultural industry. The effects of freezing temperatures on agriculture in Placer County are discussed further in Section 4.2.7 Agricultural Hazards.

In 2001, the National Weather Service (NWS) implemented an updated Wind Chill Temperature index. This index was developed to describe the relative discomfort/danger resulting from the combination of wind and temperature. Wind chill is based on the rate of heat loss from exposed skin caused by wind and cold. As the wind increases, it draws heat from the body, driving down skin temperature and eventually the internal body temperature.

Extreme Heat

According to information provided by FEMA, extreme heat is defined as temperatures that hover 10 degrees or more above the average high temperature for the region and last for several weeks. Heat kills by taxing the human body beyond its abilities. In a normal year, about 175 Americans succumb to the demands of summer heat. In the 40-year period from 1936 through 1975, nearly 20,000 people were killed in the United States by the effects of heat and solar radiation. In the heat wave of 1980 more than 1,250 people died. Extreme heat can also affect the agricultural industry. Extreme heat as it affects agriculture in Placer County is discussed further in the section on agricultural hazards.

Heat disorders generally have to do with a reduction or collapse of the body's ability to shed heat by circulatory changes and sweating or a chemical (salt) imbalance caused by too much sweating. When heat gain exceeds a level at which the body can remove it, or when the body cannot compensate for fluids and salt lost through perspiration, the temperature of the body's inner core begins to rise and heat-related illness may develop. Elderly persons, small children, chronic invalids, those on certain medications or drugs, and persons with weight and alcohol problems are particularly susceptible to heat reactions.

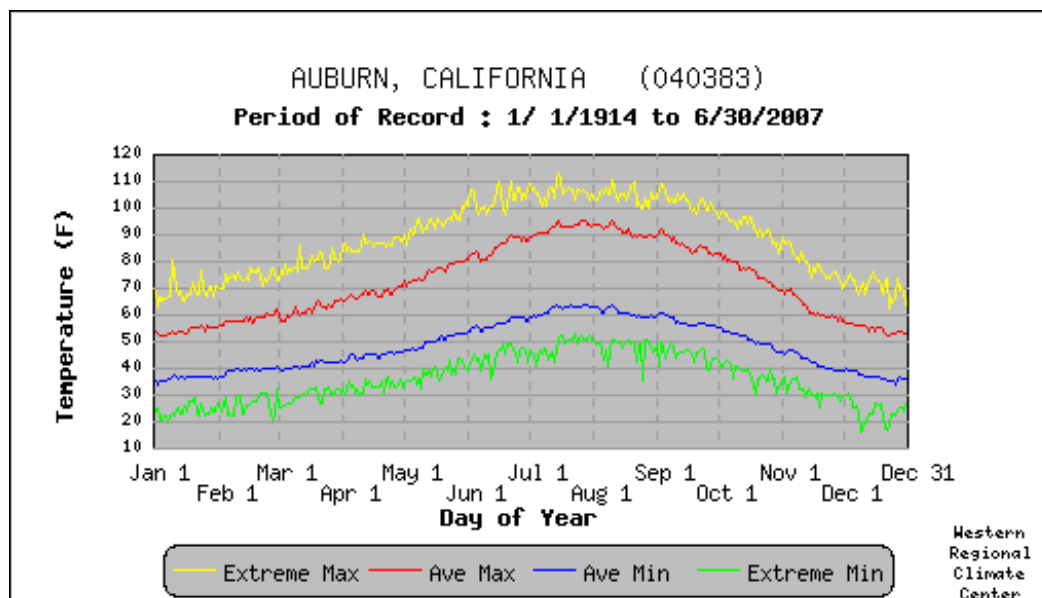
Past Occurrences

Information from the two representative weather stations introduced in Section 4.2.1 Severe Weather: General is summarized below and in Figures 4.1-4.2.

Placer County—West (Auburn Weather Station, Period of Record 1914 to 2007)

In the western portion of Placer County, monthly average maximum temperatures in the warmest months (May through October) range from the mid 70s to the low 90s. Monthly average minimum temperatures from November through April range from the mid 30s to the mid 50s. The highest recorded daily extreme was 113°F on July 15, 1972. The lowest recorded daily extreme was 16°F on December 9, 1972. In a typical year, maximum temperatures exceed 90°F on 68 days with no days falling below 32°F, and minimum temperatures fall below 32°F on 22.5 days with no days falling below 0°F.

Figure 4.1. Placer County—West Daily Temperature Averages and Extremes

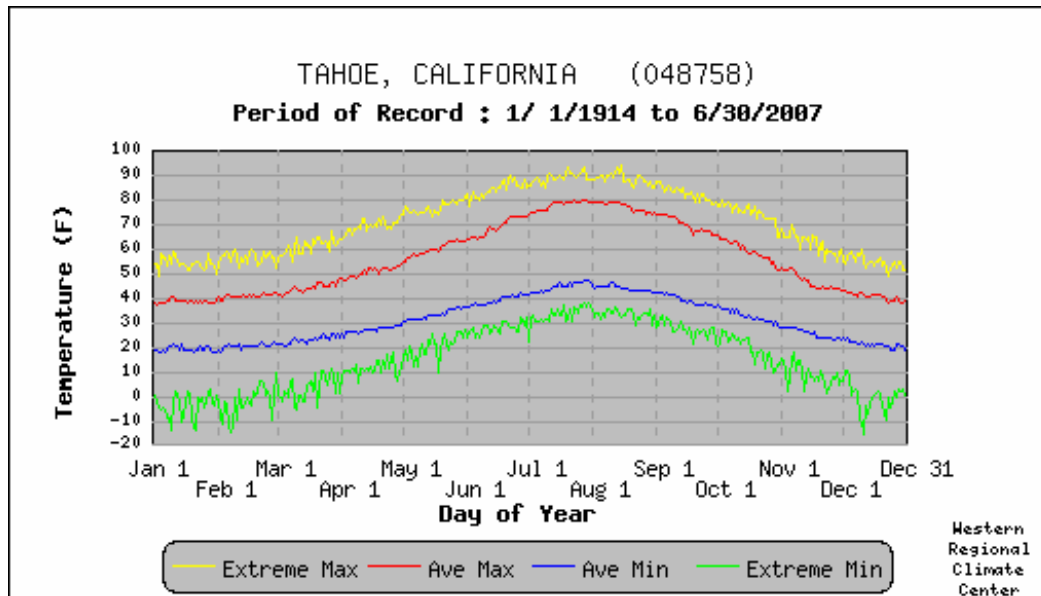


Source: Western Regional Climate Center, www.wrcc.dri.edu/

Placer County—East (Tahoe Weather Station, Period of Record 1914 to 2007)

In the eastern portion of Placer County, monthly average maximum temperatures in the warmest months (May through October) range from the high 50s to the high 70s. Monthly average minimum temperatures from November through April range from the high teens to the high 20s. The highest recorded daily extreme was 94°F on August 15, 1933. The lowest recorded daily extreme was -16°F on December 12, 1972. In a typical year, maximum temperatures exceed 90°F on .4 days with 18.5 days falling below 32°F, and minimum temperatures fall below 32°F on 207.8 days with 1.6 days falling below 0°F.

Figure 4.2. Placer County—East Daily Temperature Averages and Extremes



Source: Western Regional Climate Center, www.wrcc.dri.edu/

The HMPC identified the following events related to extreme temperatures in the Placer County planning area.

Events of Note

Extreme Cold/Freeze

- **April 17, 1972-** State declaration for freeze and sever weather conditions.
- **December 1990** – Freezing temperatures cause the fire sprinkler pipes to burst in the main office of the Placer County Office of Education causing \$107,487 in damages.
- **1999** - A severe freeze caused broken pipes at three schools in the Eureka Union School District (Oakhills, Ridgeview, Cavitt) in southern Placer County. Total damage to carpet,

drinking fountains, and miscellaneous supplies was \$10,281 (\$1000 deductible, remainder insurance).

- **December 2006/January 2007**—Placer County, as well as the State, declared a local disaster proclamation declared as result of an extreme low temperature event for the entire state. Placer County OES & HHS coordinated with the Salvation Army in the City of Roseville, and local church organizations to open warming centers at the fairgrounds in Auburn and in church affiliated facilities in the Auburn and Roseville area.

Extreme Heat

- **January 8, 1970**—A heat event recorded in the SHELDUS database reported property damage of \$75,000.
- **July 2006** – In response to extreme high temperature, the Governor’s Office of Emergency Service directed that the California Department of Food and Agriculture make each state-owned fairground a cooling center, which included the Placer County Gold Country Fairgrounds (PC GCF). PCOES and Health & Human Services served as lead in coordinating and staffing the cooling center located at the PC GCF.
- **June-September 2007**— PCOES & County HHS coordinated contingency preparedness to activate cooling centers for general public and assistance to special population in response to very high temperatures occurring throughout the summer.
- **June-September 2008**— PCOES & County HHS coordinated contingency preparedness to activate cooling centers for general public and assistance to special population in response to very high temperatures occurring throughout the summer.

Likelihood of Future Occurrences

Highly Likely—Temperature extremes are likely to continue to occur annually in the Placer County planning area.

4.2.3 Severe Weather: Fog

Hazard/Problem Description

Fog results from air being cooled to the point where it can no longer hold all of the water vapor it contains. For example, rain can cool and moisten the air near the surface until fog forms. A cloud-free, humid air mass at night can lead to fog formation where land and water surfaces that have warmed up during the summer are still evaporating water into the atmosphere. This is called radiation fog. A warm moist air mass blowing over a cold surface also can cause fog to form, which is called advection fog.

The fog season in Placer County is typically in the late fall and winter (November through March) but can occur as late as May. **TRUE??** Fog typically forms rapidly in the early morning hours. Fog can have devastating effects on transportation corridors in the County. Severe fog incidents can close roads, cause accidents, and impair the effectiveness of emergency responders.

These accidents can cause multiple injuries and deaths and can have serious implications for human health and the environment if a hazardous or nuclear waste shipment is involved.

Past Occurrences

The NCDC data shows no severe fog incidents for Placer County. However, the SHELDUS data shows two incidents of severe fog: one occurring on December 11, 1997 resulting in one fatality, 5.2 injuries and \$300,000 in property damages; and the other occurring on December 18, 1998 resulting in 1.67 injuries, 0.17 deaths and \$83,333 in property damages. From January 1, 2000 through June 30, 2004, the Auburn CHP daily log cited 60 days where traffic on I-80 was affected due to dense fog, but it is unknown whether any actual accidents occurred as a direct result of cited fog conditions. **Update**

Likelihood of Future Occurrences

Occasional—Based on the NCDC and SHELDUS data, 2 major fog incidents over a 48-year period equates to a major fog event every 24 years and a 4.2 percent chance of a major fog event in any given year. Based on input from the HMPC, it is likely that minor fog events will continue to occur annually in the Placer County planning area.

4.2.4 Severe Weather: Heavy Rain/Thunderstorm/Hail/Lightning/Wind

Hazard/Problem Description

Storms in the Placer County planning area are generally characterized by heavy rain often accompanied by strong winds and sometimes lightning and hail. Approximately 10 percent of the thunderstorms that occur each year in the United States are classified as severe. A thunderstorm is classified as severe when it contains one or more of the following phenomena: hail (three-quarters of an inch or greater), winds in excess of 50 knots (57.5 mph), or a tornado.

Hail is formed when water droplets freeze and thaw as they are thrown high into the upper atmosphere by the violent internal forces of thunderstorms. Hail is usually associated with severe storms within the Placer County planning area. Hailstones are usually less than two inches in diameter and can fall at speeds of 120 miles per hour (mph). Severe hailstorms can be quite destructive, causing damage to roofs, buildings, automobiles, vegetation, and crops.

Lightning is defined as any and all of the various forms of visible electrical discharge caused by thunderstorms. Thunderstorms and lightning are usually (but not always) accompanied by rain. Cloud-to-ground lightning can kill or injure people by direct or indirect means. Objects can be struck directly, which may result in an explosion, burn, or total destruction. Damage may also be indirect, when the current passes through or near an object, which generally causes less damage than a direct strike.

High winds, often accompanying severe thunderstorms, can cause significant property and crop damage, threaten public safety, and have adverse economic impacts from business closures and power loss. Winds in Placer County are typically straight-line winds. Straight-line winds are generally any thunderstorm wind that is not associated with rotation (i.e., is not a tornado). It is these winds, which can exceed 100 mph, which represent the most common type of severe weather and are responsible for most wind damage related to thunderstorms. These winds can overturn mobile homes, tear roofs off of houses, topple trees, snap power lines, shatter windows, and sandblast paint from cars. Other associated hazards include utility outages, arcing power lines, debris blocking streets, dust storms, and an occasional structure fire. Tornadoes (see Section 4.2.6 Tornado) and funnel clouds can sometimes occur during these types of storms.

Past Occurrences

Heavy rains and severe storms occur in the Placer County planning area primarily during the late fall, winter, and spring (i.e., November through April), but can be quite variable throughout the county due to the dramatic change in elevation and climate. Damaging winds often accompany winter storm systems moving through the area.

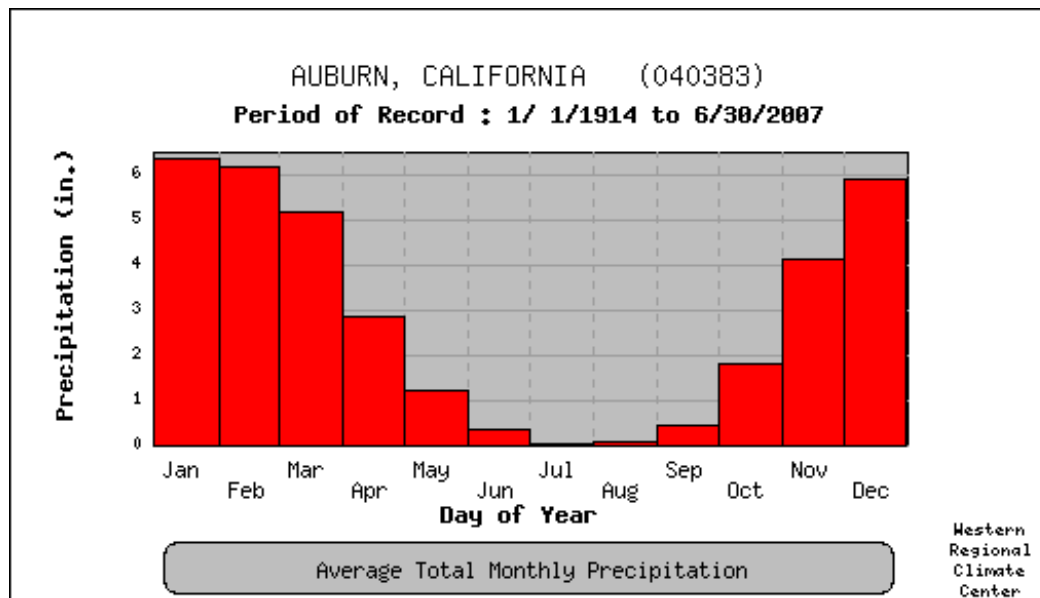
According to the HMPC, short-term, heavy storms can cause both widespread flooding as well as extensive localized drainage issues. With the increased growth of the area, the lack of adequate drainage systems has become an increasingly important issue. In addition to the flooding that often occurs during these storms, strong winds, when combined with saturated ground conditions, can down very mature trees.

Information from the two representative weather stations introduced in Section 4.2.1 Severe Weather: General, is summarized below and in Figures 4.3-4.6.

Placer County—West (Auburn Weather Station, Period of Record 1914 to 2007)

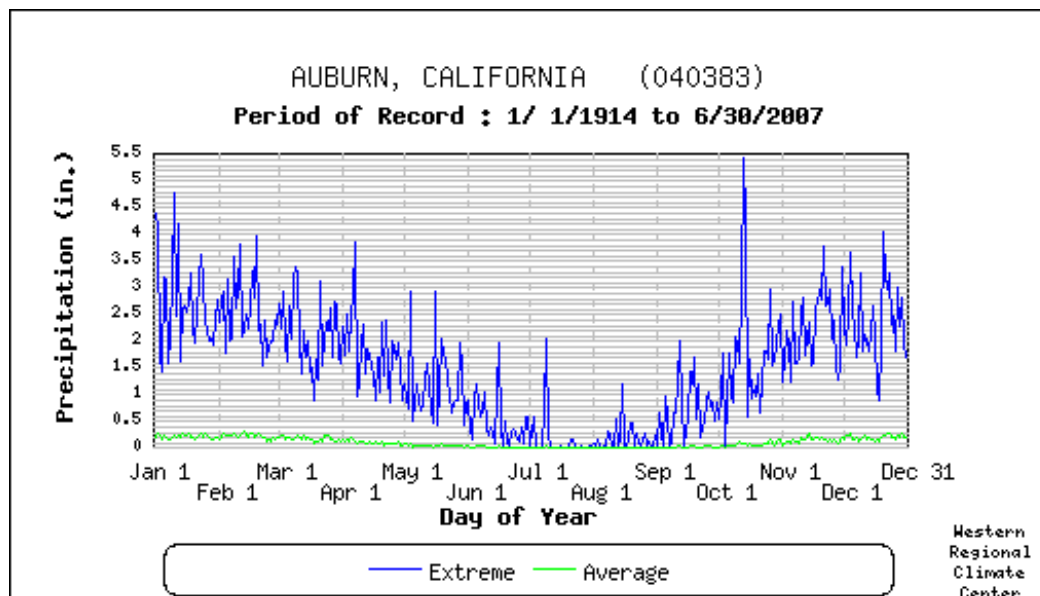
Average annual precipitation in the western side of Placer County is 34.49 inches per year. The highest recorded annual precipitation is 64.87 inches in 1983; the highest recorded precipitation for a 24-hour period is 5.41 inches on October 13, 1962. The lowest recorded annual precipitation is 11.76 inches in 1976.

Figure 4.3. Placer County—West Monthly Average Total Precipitation



Source: Western Regional Climate Center, www.wrcc.dri.edu/

Figure 4.4. Placer County—West Daily Average and Extreme Precipitation

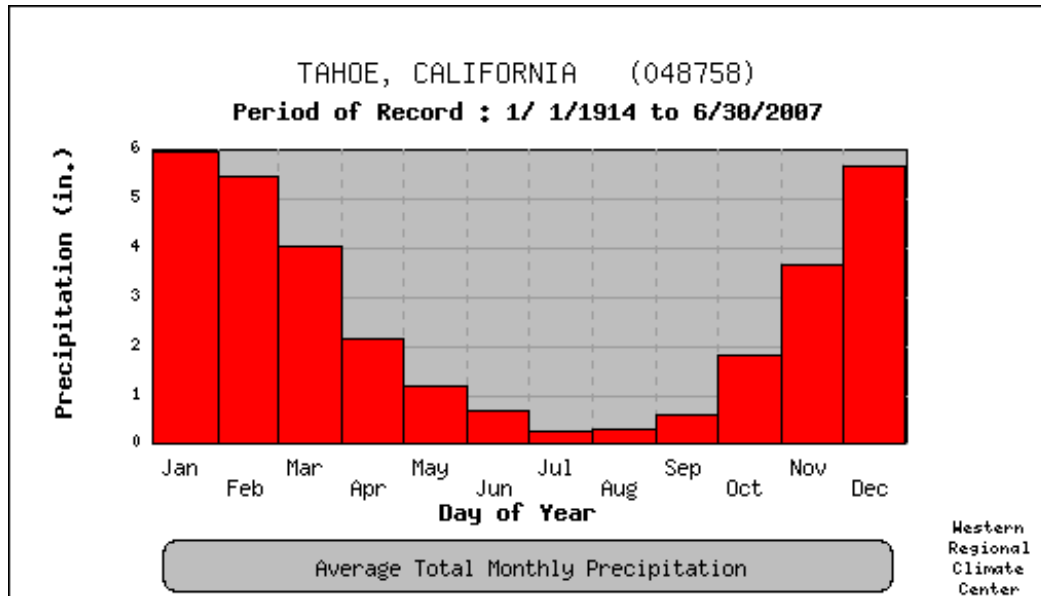


Source: Western Regional Climate Center, www.wrcc.dri.edu/

Placer County—East (Tahoe Weather Station, Period of Record 1914 to 2007)

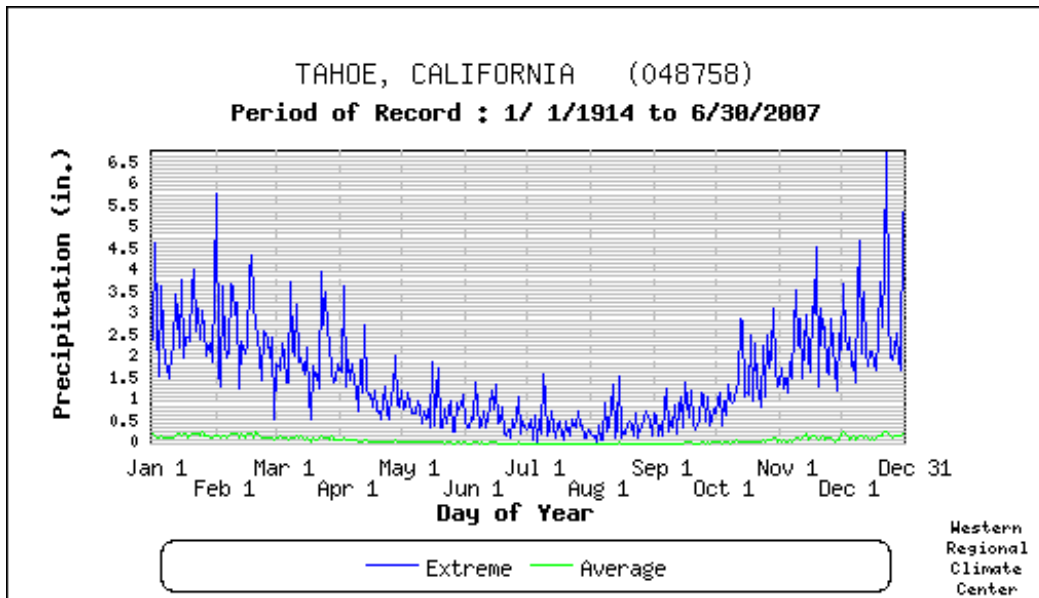
Average annual precipitation in the western portion of Placer County is 31.77 inches per year. The highest recorded annual precipitation is 66.41 inches in 1996; the highest recorded precipitation for a 24-hour period is 6.77 inches on December 23, 1964. The lowest recorded annual precipitation is 9.34 inches in 1976.

Figure 4.5. Placer County—East Monthly Average Total Precipitation



Source: Western Regional Climate Center, www.wrcc.dri.edu/

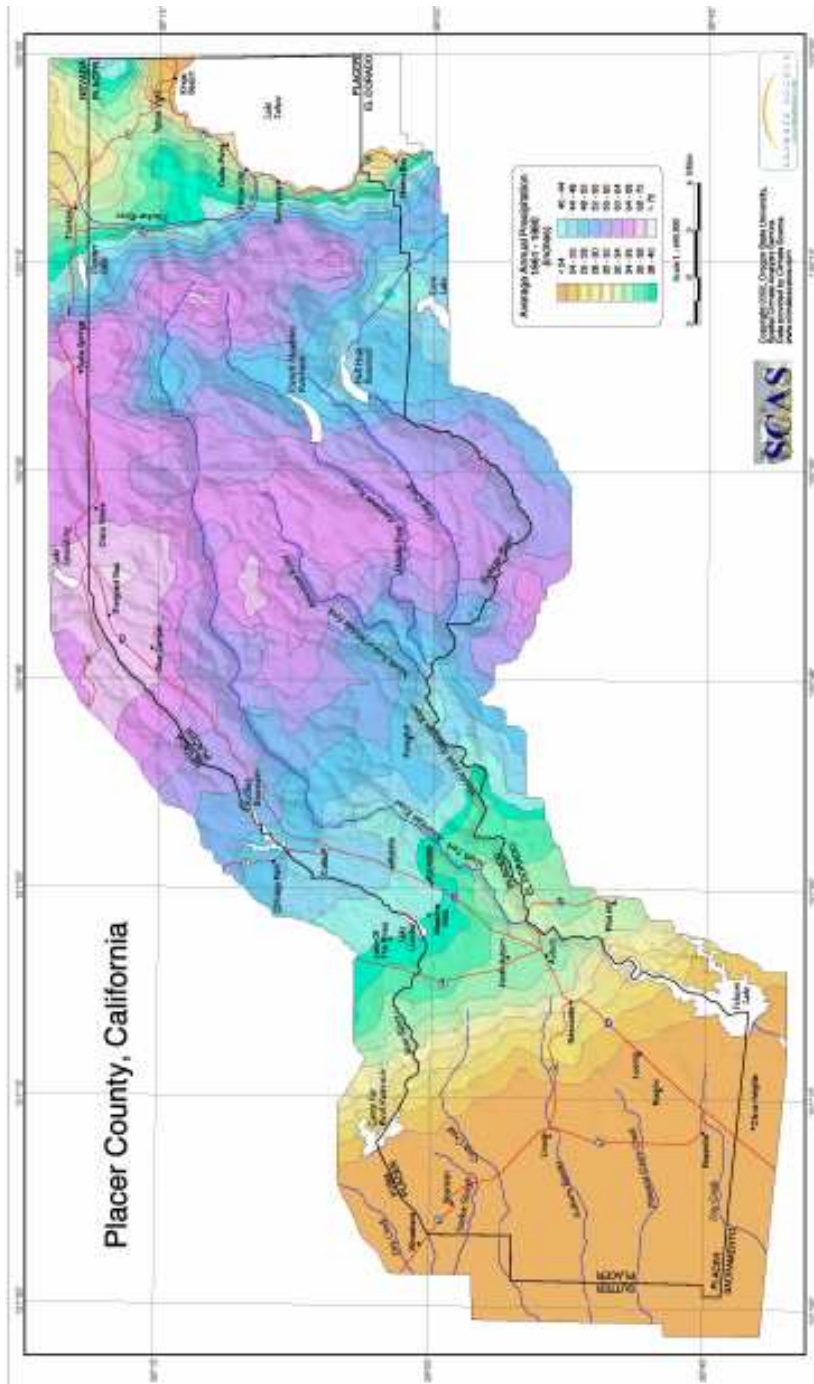
Figure 4.6. Placer County—East Daily Average and Extreme Precipitation



Source: Western Regional Climate Center, www.wrcc.dri.edu/

Figure 4.7 illustrates average annual precipitation from 1969 through 1990 for all of Placer County.

Figure 4.7. Average Annual Precipitation for Placer County 1969-1990



Severe weather events associated with heavy rain/thunderstorm/hail/lightning/wind include those listed in Tables 4.2-4.3 in Section 4.2.1 Severe Weather: General, and the following events detailed by the HMPC. Others??:

- **February 1, 1990** – A rain storm caused water damage to a floor in the Forresthill Union School District causing \$4,680 in damages.
- **February 20/21, 1990** – Excessive rain and wind closed the schools in Colfax and Iowa Hill; damages unknown.
- **March 4, 1991** – High winds caused a roof to blow off a building in the Forresthill Union School District causing \$10,629 in damages.
- **January 10/11, 1995**– Excessive rain and wind closed the school in Colfax; damages unknown.
- **1995 Winter Storms** – The roof drains of the Placer Union High School gymnasium became clogged, damaging the roof and flooding the gymnasium. Damages were incurred and FEMA paid out disaster monies in the amount of \$7,108.33.
- **December 12, 1995** – High winds caused a power outage resulting in the closure of Franklin Elementary, Placer Elementary, and Loomis Grammar School (Loomis Union School District).
- **1996** – Heavy rain clogged storm drains causing flooding in the Cavitt School gymnasium in southern Placer County. Total damage was \$85,976 covered by Emergency Services under a disaster declaration.
- **December 16, 2002** – Excessive rain and wind closed the school in Colfax; damages unknown.
- **December 20, 2002** – High winds caused a power outage resulting in the Franklin Elementary School closure (Loomis Union School District).
- **October 31, 2003** - Winds associated with heavy storms caused a power outage and closure of Truckee Elementary School. The area affected Donner Pass Road in the city of Truckee. Costs associated with the closure were paid for by the State insurance program.
- **December 2005/January 2006**- Flooding occurred in the County as a result of heavy rains and stormwater runoff caused by severe winter storms. Storms impacted transit on public roads and caused some business closures.
- **March/April 2006** – Spring storm resulted in local disaster proclamation from extended rain and wind storm. Placer County roadways in unincorporated areas, particularly Foresthill Road and Ophir Road, were significantly damaged due to rain and mudslides. Costs to public agencies were in excess of \$1 million.
- **January 2008** –Severe winter storms brought massive snow, rain, and near record winds to Northern California over the first weekend in January, 2008 beginning on Friday January 4, 2008. It resulted in the temporary loss of power to some 2.5 million PG&E customers throughout Northern California; approximately 45,000 in Placer County alone. In some cases, power outages lasted up to six days; and, in addition to the power outages, extensive physical damage was recorded in the foothill area between Alta/Dutch Flat and Foresthill due primarily to falling trees or large tree limbs. Numerous other houses and businesses

Comment: This # seems low.

throughout the foothills and western portions of the County were damaged by falling trees, flying debris, water or wind. As a result, Placer County declared a local emergency.

The initial damage assessment provided to the State Office of Emergency Services indicated damages of over \$410,000 in the public sector, and an estimated \$600,000 of private, residential damage. Businesses losses were much smaller and initial estimates were in the range of only \$205,000 total for five businesses.

Likelihood of Future Occurrences

Highly Likely—Severe weather, including heavy rain, thunderstorms, hail, lightning, and wind is a well-documented seasonal occurrence that will continue to occur annually in the Placer County planning area.

4.2.5 Severe Weather: Snow

Winter snow storms can include heavy snow, ice, and blizzard conditions. Heavy snow can immobilize a region, stranding commuters, stopping the flow of supplies, and disrupting emergency and medical services. Accumulations of snow can collapse roofs and knock down trees and power lines. In rural areas, homes and farms may be isolated for days, and unprotected livestock may be lost. The cost of snow removal, damage repair, and business losses can have a tremendous impact on cities and towns.

Heavy accumulations of ice can bring down trees, electrical wires, telephone poles and lines, and communication towers. Communications and power can be disrupted for days until the damage can be repaired. Power outages can have a significant impact on communities, especially critical facilities such as public utilities. Even small accumulations of ice may cause extreme hazards to motorists and pedestrians.

Some winter storms are accompanied by strong winds, creating blizzard conditions with blinding wind-driven snow, severe drifting, and dangerous wind chills. Strong winds accompanying these intense storms and cold fronts can knock down trees, utility poles, and power lines. Blowing snow can reduce visibility to only a few feet in areas where there are no trees or buildings. Serious vehicle accidents with injuries and deaths can result,

The western portion of the Placer County planning area does not experience snowfall on a regular seasonal basis; however, the northern and eastern portions of the County receive an abundance of snow, mostly between the months of November through March. Winter snow storms in this part of the County, including strong winds and blizzard conditions can result in localized power and phone outages and closures of streets, highways, schools, businesses, and nonessential government operations. During periods of heavy snow there is also an increase in the number and severity of traffic accidents. People can become isolated in their homes and vehicles and are unable to receive essential services. Snow removal costs can impact budgets significantly. Heavy snowfall during winter can lead to flooding or landslides during the spring if

the area snowpack melts too quickly and also create numerous challenges for emergency responders. In the higher elevations at Lake Tahoe, snowfall will bury fire hydrants and street signs. It can often take the district weeks to dig out the approximately 2500 fire hydrants. This is exacerbated by County snow plows/blowers re-burying the hydrants in subsequent plowing efforts. Inaccessible hydrants and/or delayed responses can impact life and property.

Past Occurrences

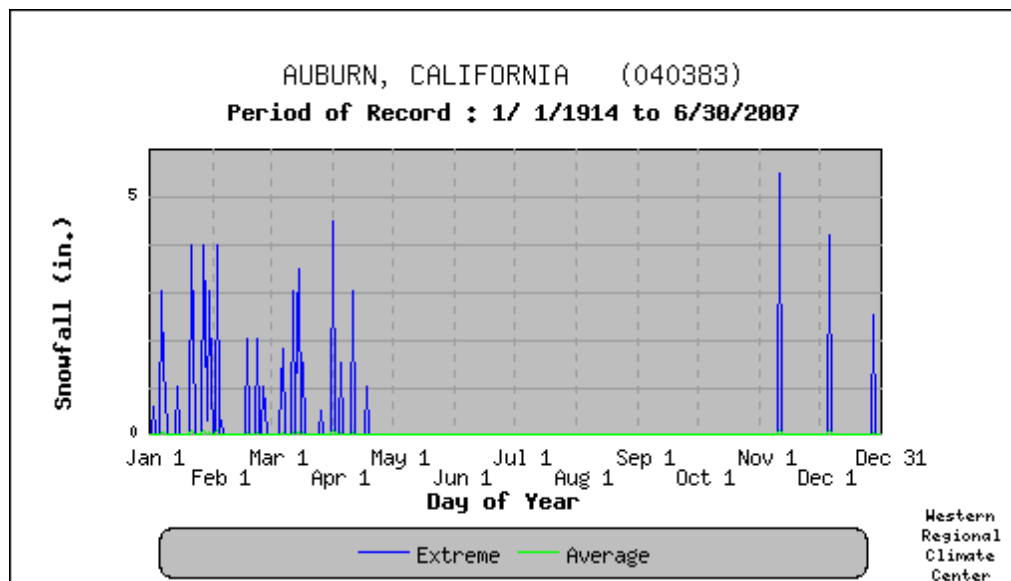
Snowfall in the Sierra Nevada Mountains increases with elevation. The lower foothills rarely receive any measurable snow. Middle elevations receive a mix of snow and rain during the winter. Above about 6,000 ft., the majority of precipitation falls as snow. It is not unusual, in some locations, to have ten feet of snow on the ground for extended periods.

Information from the two representative weather stations introduced in Section 4.2.1 Severe Weather: General is summarized below.

Placer County—West (Auburn Weather Station, Period of Record 1914 to 2007)

Between the period from 1914 to 2007, the annual average snowfall in the City of Auburn was 1.2 inches of snow. The highest annual snowfall on record for the City of Auburn was 10.7 inches occurring in 1972. Figure 4.8 illustrates the Daily Snowfall Average and Extreme for the Auburn Weather Station in western Placer County.

Figure 4.8. Placer County—West Daily Average and Extreme Snowfall

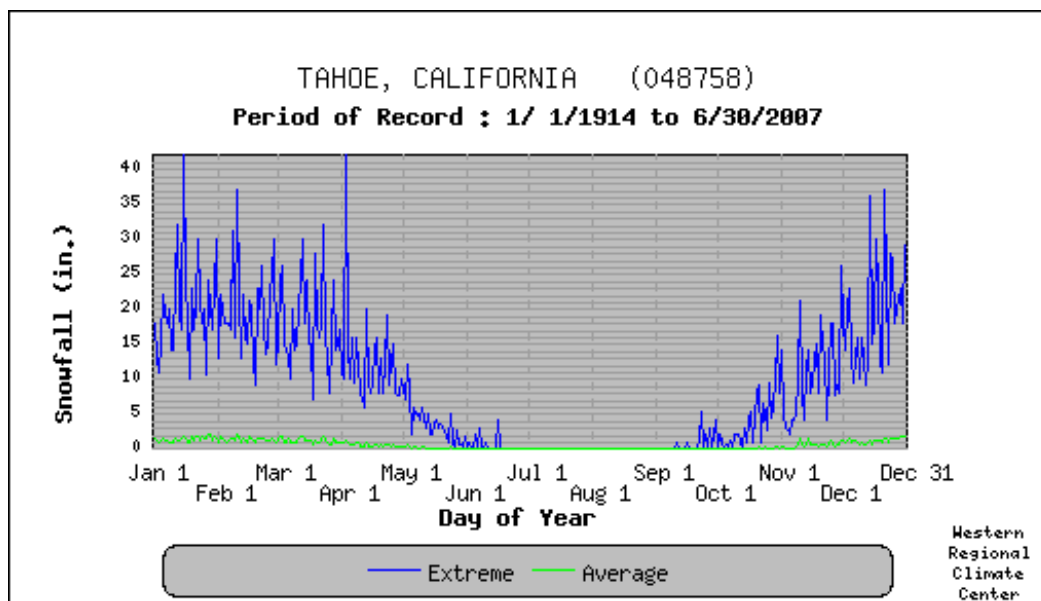


Source: Western Regional Climate Center, www.wrcc.dri.edu/

Placer County—East (Tahoe Weather Station, Period of Record 1914 to 2007)

On the other extreme, in the eastern side of the County, Tahoe receives an average annual snowfall of 188.9 inches with a record annual snowfall of 499.3 inches in 1952. December, January, February and March are the snowiest months of the year, with an average snowfall of 35.1, 42.7, 37.7, and 35.0 inches respectively. November and April follow with an average snowfall of 15.9 and 16.0 inches. Figure 4.9 illustrates the Daily Snowfall Average and Extreme for the Tahoe Weather Station in eastern Placer.

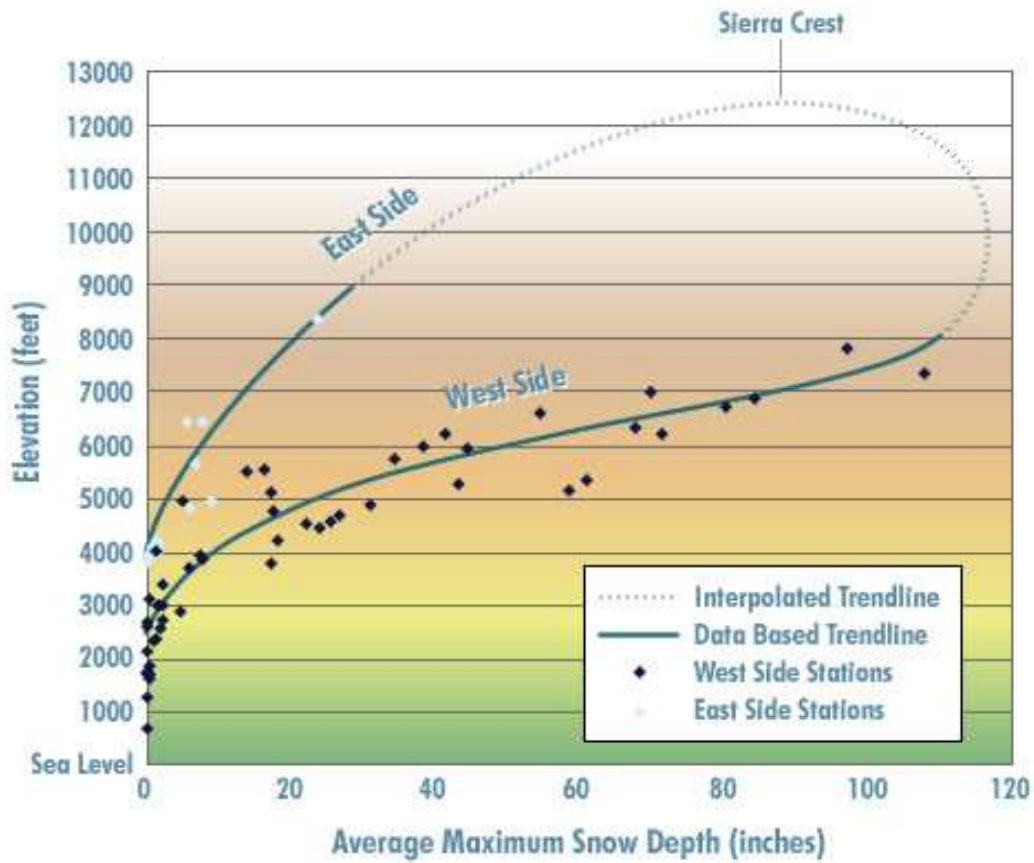
Figure 4.9. Placer County—East Daily Average and Extreme Snowfall



Source: Western Regional Climate Center, www.wrcc.dri.edu/

Snow accumulation does not directly follow precipitation in the Sierra Nevada. While the greatest total precipitation occurs in the northern part of the range, the greatest snow accumulation occurs in the central and high southern parts of the range, due to higher elevations and colder temperatures which inhibit snow melt. The western slope of the Sierra Nevada acts as trap for winter storms, wringing out the moisture before it can get to the east side. Weather stations located on the west side begin registering measurable snow between 2,500 and 3,000 feet elevation. On the east side, measurable snow accumulation doesn't begin until about 4,000 feet and increases more slowly with altitude. Snow depths drop dramatically on the east side of the range due to the rain shadow effect as illustrated in the comparative east side/west side snow depth chart shown on the following page.

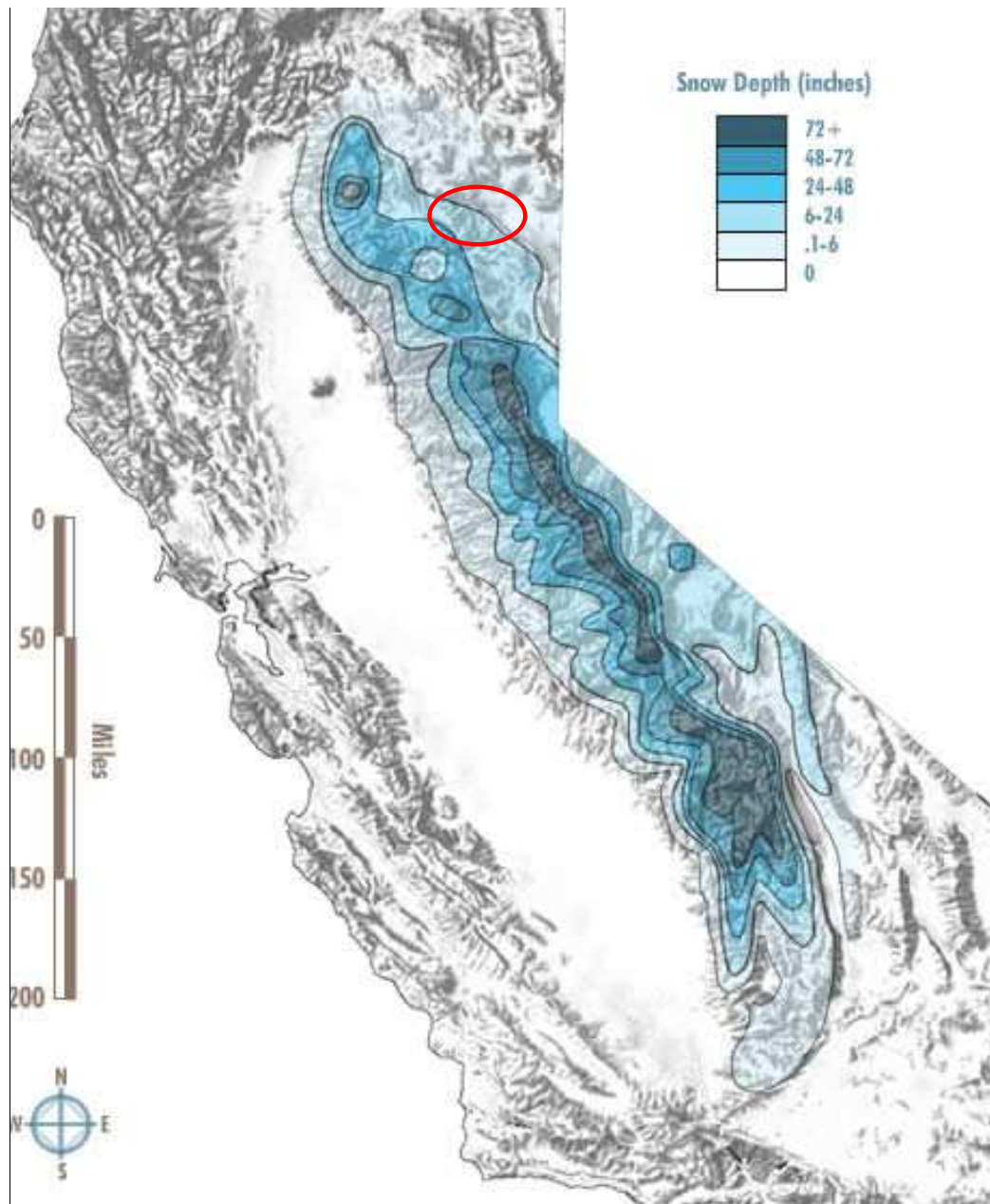
Figure 4.10. Snow Accumulation with Directional Variations



(Source: http://www.sierranevadaphotos.com/geography/east_west_snow_depth.html)

The following map shows the average maximum measured snow depth in the Sierra Nevada for the month of March (the month of greatest average snow depths).

Figure 4.11. Average Maximum Snow Depths of Sierra Nevada Mountains in March



(Source: http://www.sierranevadaphotos.com/geography/snow_depth.asp)

According to the HMPC, the following winter snow events impacted the Placer County planning area. **Others??**

- **December 17, 1992** – Heavy snows on a roof caused damages to a building located in the Forresthill Union School District causing \$3,371 in damages.
- **March 23, 1995** – Excessive snow closed the school in Colfax; damages unknown.
- **January 26, 1999** – Excessive snow closed the school in Colfax; damages unknown.
- **February 2003** – A severe snowstorm caused a variety of damage to schools located in the areas of Tahoe City, West Shore, and Polaris Road. The snowstorm caused an underground propane leak at one school, a district-wide power outage, and damages resulting from roof snow loading and removal. School closures ranged from two days to two weeks.

According to the California Highway Patrol (CHP), Auburn Area (whose jurisdiction on I-80 extends from the Placer/Sacramento County line to the western edge of Colfax), weather-related incidents resulting in metering, chain control, accident control, holding, and closure are annual occurrences. From January 1, 2000 through June 30, 2004, the Auburn CHP daily log cited 60 days where traffic on I-80 was affected due to adverse weather conditions. Of these, five were associated with dense fog; the remaining were a combination of rain, hail, sleet, and snow conditions. **Update**

Likelihood of Future Occurrences

Highly Likely—Snow in the central and eastern region of the County is a well-documented seasonal occurrence that will continue to occur annually in the Placer County planning area.

4.2.6 Severe Weather: Tornado

Hazard/Problem Description

Tornadoes are another severe weather hazard that can affect the Placer County planning area, primarily during the rainy season in the late fall and early spring. Tornadoes form when cool, dry air sits on top of warm, moist air. Tornadoes are rotating columns of air marked by a funnel-shaped downward extension of a cumulonimbus cloud whirling at destructive speeds of up to 300 mph, usually accompanying a thunderstorm. Tornadoes are the most powerful storms that exist. They can have the same pressure differential across a path only 300-yards wide or less as a 300-mile-wide hurricanes.

Prior to February 1, 2007, tornado intensity was measured by the Fujita (F) scale. This scale was revised and is now the Enhanced Fujita scale. Both scales are sets of wind estimates (not measurements) based on damage. The new scale provides more damage indicators (28) and associated degrees of damage, allowing for more detailed analysis and better correlation between damage and wind speed. It is also more precise because it takes into account the materials affected and the construction of structures damaged by a tornado. Table 4.4 shows the wind speeds associated with the original Fujita scale ratings and the damage that could result at different levels of intensity. Table 4.5 shows the wind speeds associated with the Enhanced

Fujita Scale ratings. The Enhanced Fujita Scale's damage indicators and degrees of damage can be found online at www.spc.noaa.gov/efscale/ef-scale.html.

Table 4.4. Original Fujita Scale

Fujita (F) Scale	Fujita Scale Wind Estimate (mph)	Typical Damage
F0	< 73	Light damage. Some damage to chimneys; branches broken off trees; shallow-rooted trees pushed over; sign boards damaged.
F1	73-112	Moderate damage. Peels surface off roofs; mobile homes pushed off foundations or overturned; moving autos blown off roads.
F2	113-157	Considerable damage. Roofs torn off frame houses; mobile homes demolished; boxcars overturned; large trees snapped or uprooted; light-object missiles generated; cars lifted off ground.
F3	158-206	Severe damage. Roofs and some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted; heavy cars lifted off the ground and thrown.
F4	207-260	Devastating damage. Well-constructed houses leveled; structures with weak foundations blown away some distance; cars thrown and large missiles generated.
F5	261-318	Incredible damage. Strong frame houses leveled off foundations and swept away; automobile-sized missiles fly through the air in excess of 100 meters (109 yards); trees debarked; incredible phenomena will occur.

Source: National Oceanic and Atmospheric Administration Storm Prediction Center, www.spc.noaa.gov/faq/tornado/f-scale.html

Table 4.5. Enhanced Fujita Scale

Enhanced Fujita (EF) Scale	Enhanced Fujita Scale Wind Estimate (mph)
EF0	65-85
EF1	86-110
EF2	111-135
EF3	136-165
EF4	166-200
EF5	Over 200

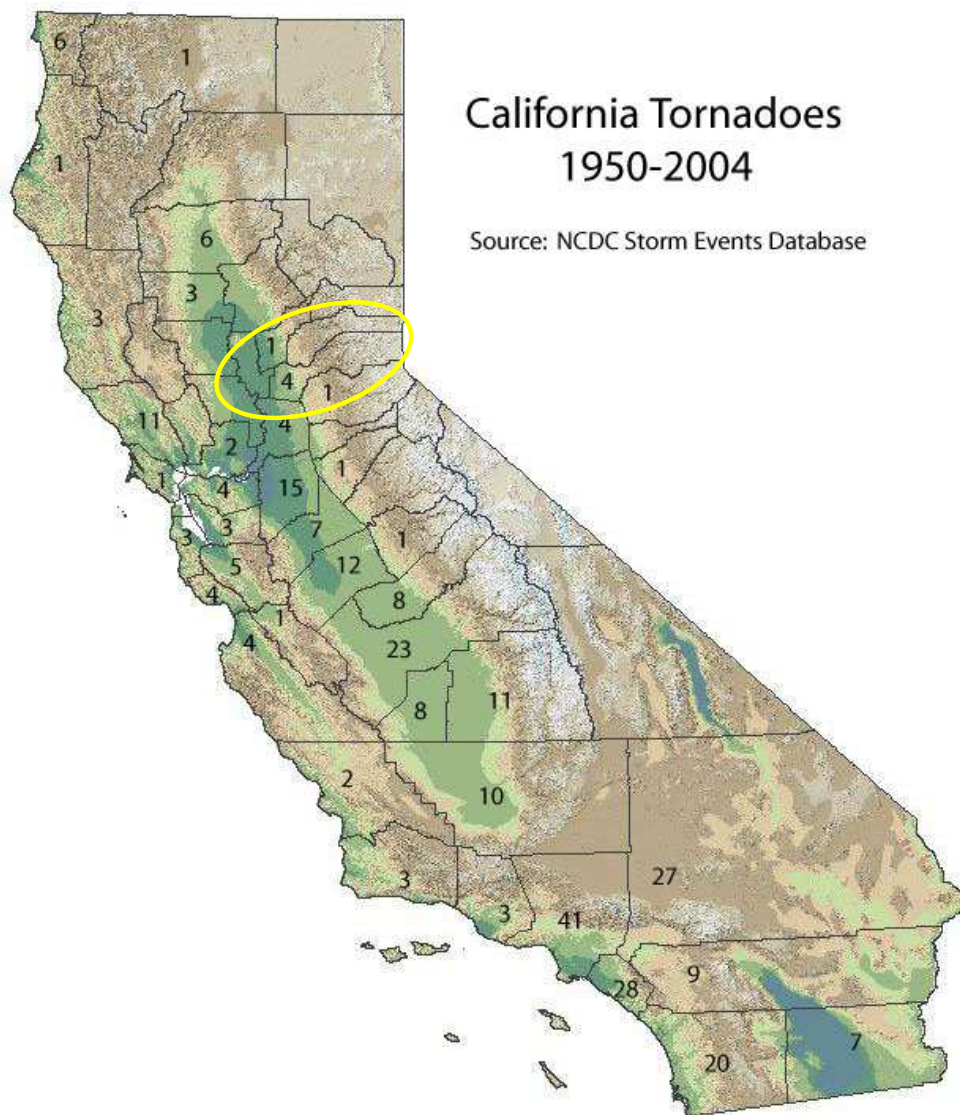
Source: National Oceanic and Atmospheric Administration Storm Prediction Center, www.spc.noaa.gov/faq/tornado/ef-scale.html

Tornadoes can cause damage to property and loss of life. While most tornado damage is caused by violent winds, the majority of injuries and deaths generally result from flying debris. Property damage can include damage to buildings, fallen trees and power lines, broken gas lines, broken sewer and water mains, and the outbreak of fires. Agricultural crops and industries may also be damaged or destroyed. Access roads and streets may be blocked by debris, delaying necessary emergency response.

Past Occurrences

Based on data from 1950-1995, California ranks 32nd among the 50 states for frequency of tornadoes, 36th for injuries, and 31st for cost of damage. When compared to other states by the frequency per square mile, California ranks 44th for frequency and injuries per area and 40th for cost of damage per area. Figure 4.12 shows tornado frequency by California county using NCDC data from 1950 to 2004.

Figure 4.12. California Tornadoes, 1950-2004



Source: Golden Gate Weather Service, <http://ggweather.com/ca-tornado.jpg>

Table 4.6. Placer County – Tornado Occurrences

Date	Rating (Original Fujita Scale)	Damages	Data Source
10/15/1972	F0	None	NCDC
3/3/1983	F0	None	NCDC
3/22/1983	F1	\$250,000 property damage	NCDC
4/23/1990	F0	\$3,000 property damage. \$7,835 in damages to Penryn Elementary School District	NCDC Penryn Elementary School District
12/6/1992	Unknown	Unspecified property damage	SHELDUS

Source: NCDC/SHELDUS Databases

Likelihood of Future Occurrences

Occasional—Five tornadoes occurred in Placer County over 58 years of record keeping which equates to one tornado every 11.6 years, on average, and a 8.6 percent chance of a tornado occurring in any given year. Historical tornado activity within the planning area indicates that the area will occasionally experience the formation of funnel clouds and low intensity tornadoes during adverse weather conditions. The actual risk to the County is dependent on the nature and location of any given tornado.

4.2.7 Agricultural Hazards

Hazard/Problem Description

Before its rapid population growth in the 1970s and 1980s, Placer County was known as an agricultural and timber-producing county. Agriculture and timber production are still important sectors of the County's economy; however, manufacturing, recreation, and service industries have increased in economic importance. Agricultural lands continue to be at risk to development based on population growth projections for the County. In western Placer County, land traditionally used for agricultural purposes lies near existing cities and is expected to accommodate much of this population increase. While its agricultural land is threatened, Placer County retains a significant amount of agricultural land where the economy is intact and where farmers are a real presence in the community.

According to the California Department of Conservation's Farmland Mapping and Monitoring Program (FMPP), the County has approximately 9,236 acres of prime farmland, 5,509 acres of farmland of statewide importance, and 46,000 acres of grazing land (see Table 4.7).

Table 4.7. Placer County Farmland Inventory, 2004

Soil Category	Acres
Prime Farmland	9,236
Farmland of Statewide Importance	5,509

Soil Category	Acres
Unique Farmland	23,283
Farmland of Local Importance	86,234
Grazing Land	46,000
Urban and Built-Up Land	42,181
Water	5,027
Other Land	184,058
Total Area Inventoried	411,528

Source: State of California Department of Conservation Farmland Mapping and Monitoring Program, www.conservation.ca.gov/

According to the 2007 crop report, the 2006 total gross value of agricultural products in the County was \$64,297,934. The total gross value for 2007 was \$59,728,150, representing an decrease of \$4,569,784. This report reflects the gross value of agricultural products and not the net income growers receive.

Rice regained its position as Placer County's number one crop in 2007 with a gross value of \$11,362,680. Nursery products dropped to number two in total value at \$10,360,240, which can be directly attributed to the significant decrease in residential construction Placer County experienced over the last year. Cattle and calf production remained in third place at \$9,333,300, while timber production also felt the effects of the downturn in the current housing market and dropped from second place to fourth at \$7,347,598. Walnuts were again Placer County's fifth most valuable crop with a gross value of \$2,846,278.

According to the HMPC, agricultural losses occur on an annual basis and are usually associated with severe weather events, including heavy rains, floods, heat, and drought. The State of California Multi-Hazard Mitigation Plan attributes most of the agricultural disasters statewide to drought, freeze, and insect infestations. Other agricultural hazards include fires, crop and livestock disease, and noxious weeds.

Placer County is threatened by a number of insects that, under the right circumstances, can cause severe economic and environmental harm to the agricultural industry. Insects of concern to plants and crops include the melon fruit fly, Oriental fruit fly, Mediterranean fruit fly, gypsy moth, light brown apple moth, Japanese beetle, and glassy-winged sharpshooter.

Noxious weeds, defined as any plant that is or is liable to be troublesome, aggressive, intrusive, detrimental, or destructive to agriculture, silviculture, or important native species, and difficult to control or eradicate, are also of concern. Noxious weeds within the planning area include yellow starthistle, citrus red scale, Italian thistle, klamathweed, puncturevine, red gum lerp psyllid, and skeletonweed.

Noxious weeds have been introduced in the planning area by a variety of means, including through commercial nurseries. An absence of natural controls, combined with the aggressive growth characteristics and unpalatability of many of these weeds, allows these weeds to

dominate and replace more desirable native vegetation. Negative effects of weeds include the following:

- Loss of wildlife habitat and reduced wildlife numbers
- Loss of native plant species
- Reduced livestock grazing capacity
- Increased soil erosion and topsoil loss
- Diminished water quality and fish habitat
- Reduced cropland and farmland production
- Reduced land value and sale potential.

According to the HMPC, the consequences of agricultural disasters to the planning area include ruined plant crops, dead livestock, ruined feed and agricultural equipment, monetary loss, job loss, and possible multi-year effects (i.e., trees might not produce if damaged, loss of markets, food shortages, increased prices, possible spread of disease to people, and loss or contamination of animal products). When these hazards cause a mass die-off of livestock, other issues occur that include the disposal of animals, depopulation of affected herds, decontamination, and resource problems. Those disasters related to severe weather may also require the evacuation and sheltering of animal populations. Overall, any type of severe agricultural disaster can have significant economic impacts on both the agricultural community and the entire Placer County planning area.

Past Occurrences

The Placer County Department of Agriculture provided information on disaster declarations from 2002 through 2008. All but one of the declarations were associated with severe weather events.

Table 4.8 Placer County USDA Designations: 2002-2008

Year	Incident Type
2002	Drought Event
2002	Rain/Wind Event
2003	Hail/Freeze Event
2003	Excessive/Late Rain Event
2003	Drought Event
2003	Late Rain/Heat Event
2004	Drought Event
2004	Unseasonably Early Heat Event
2004	Fire Event
2005	Freeze Event

Year	Incident Type
2005	Unseasonably Late Rain Event
2005	Heat Event
2006	Heat Event
2006	Severe Weather Event (Rain/Hail)
2007	Heat Event
2007	Freeze Event
2007	Drought Event
2008	Drought Event
2008	Freeze Event
2008	Wind Event

Source: Placer County Department of Agriculture

Likelihood of Future Occurrences

Highly Likely—As long as severe weather events continue to be an ongoing concern to the Placer County planning area, the potential for agricultural losses remains.

4.2.8 Avalanche

Avalanches occur when loading of new snow increases stress at a rate faster than strength develops, and the slope fails. Critical stresses develop more quickly on steeper slopes and where deposition of wind-transported snow is common. The vast majority of avalanches occur during and shortly after storms. This hazard generally affects a small number of people, such as snowboarders, skiers, and hikers, who venture into backcountry areas during or after winter storms. Roads and highway closures, damaged structures, and destruction of forests are also a direct result of avalanches. The combination of steep slopes, abundant snow, weather, snowpack, and an impetus to cause movement creates avalanches. Areas prone to avalanche hazards include hard to access areas deep in the backcountry. Avalanche hazards exist in eastern Placer County where combinations of the above criteria occur.

Past Occurrences

Historically, avalanches occur within the County between the months of December and March, following snowstorms. Although avalanches have occurred on slopes of many angles, they most often occur on slopes ranging between 30 degrees and 45 degrees. Therefore ski resorts, residences, roads, businesses, and other structures and activities in these areas are vulnerable. Areas where the potential for avalanches to exist are zoned as moderate or high avalanche hazard zones and have been identified using maps available at the Placer County Planning Department. Moderate hazard zones are usually on shallow slopes and located immediately downhill of high zones. These high and moderate zones are located near the Nevada County line, south of Donner

Lake and Lake Van Norden, east of Tahoe City, near Twin Peaks and McKinney Bay, and in areas near Squaw Valley, Alpine Meadows, and Sugar Bowl. According to the 2004 Placer Operational Area, Emergency Operations Plan, areas of particular concern include:

- Alpine Meadows, Bear Creek drainage;
- West shore of Donner Lake;
- Donner Summit/Norden Area;
- West shore of Lake Tahoe (Homewood & Ward Creek tract);
- Serene Lakes, Onion Creek drainage;
- Squaw Valley;
- Sugar Bowl Ski Resort and Onion Creek;
- Truckee River Corridor/Highway 89 Corridor; and
- Northstar Ski Resort.

The following recent avalanche incidents have resulted in fatalities within Placer County:

- **March 31, 1982** – At Alpine Meadows, a 30-foot high wall of snow plowed through a ski lodge and other buildings at 80 mph, killing seven people.
- **February 11, 1998** – Donner Summit backcountry, one fatality - snowboarder.
- **February 6, 1999** – Donner Summit, one fatality.
- **February 21, 2001** – Squaw Valley, two fatalities, Class II Avalanche. A storm resulted in 20 inches of snow and winds out of the SSW were in the 40-50 mile per hour range with gusts up to 60-70 miles per hour.
- **March 8, 2002** – Sugarbowl Resort, one fatality. A storm hit with 34 inches of snow and winds were up to 100 miles per hour.
- **January 1, 2004** – Donner Summit near Castle Peak, one fatality.
- **MORE?**

Likelihood of Future Occurrences

Likely—Injuries and loss of life from an avalanche are usually due to people recreating in remote areas at the wrong time. Given the topography and amount of snow falling on an annual basis in eastern Placer County, avalanches and resulting damages, including injuries and loss of life, will continue to occur.

4.2.9 Dam Failure

Hazard/Problem Description

Dams are manmade structures built for a variety of uses including flood protection, power generation, agriculture, water supply, and recreation. When dams are constructed for flood protection, they are usually engineered to withstand a flood with a computed risk of occurrence. For example, a dam may be designed to contain a flood at a location on a stream that has a

certain probability of occurring in any one year. If prolonged periods of rainfall and flooding occur that exceed the design requirements, that structure may be overtopped and fail. Overtopping is the primary cause of earthen dam failure in the United States.

Dam failures can also result from any one or a combination of the following causes:

- Earthquake;
- Inadequate spillway capacity resulting in excess overtopping flows;
- Internal erosion caused by embankment or foundation leakage, or piping or rodent activity;
- Improper design;
- Improper maintenance;
- Negligent operation; and/or
- Failure of upstream dams on the same waterway.

Water released by a failed dam generates tremendous energy and can cause a flood that is catastrophic to life and property. A catastrophic dam failure could challenge local response capabilities and require evacuations to save lives. Impacts to life safety will depend on the warning time and the resources available to notify and evacuate the public. Major loss of life could result as well as potentially catastrophic effects to roads, bridges, and homes. Electric generating facilities and transmission lines could also be damaged and affect life support systems in communities outside the immediate hazard area. Associated water supply, water quality and health concerns could also be an issue. Factors that influence the potential severity of a full or partial dam failure are the amount of water impounded; the density, type, and value of development and infrastructure located downstream; and the speed of failure.

In general, there are three types of dams: concrete arch or hydraulic fill, earth and rockfill, and concrete gravity. Each type of dam has different failure characteristics. A concrete arch or hydraulic fill dam can fail almost instantaneously; the flood wave builds up rapidly to a peak then gradually declines. An earth-rockfill dam fails gradually due to erosion of the breach; a flood wave will build gradually to a peak and then decline until the reservoir is empty. And, a concrete gravity dam can fail instantaneously or gradually with a corresponding buildup and decline of the flood wave.

Dams and reservoirs have been built throughout California to supply water for agriculture and domestic use, to allow for flood control, as a source of hydroelectric power, and to serve as recreational facilities. The storage capacities of these reservoirs range from a few thousand acre-feet to five million acre-feet. The water from these reservoirs eventually makes its way to the Pacific Ocean by way of several river systems.

According to data provided by Placer County and the National Inventory of Dams, there are 54 dams in Placer County constructed for flood control, storage, electrical generation, and recreational purposes. There are two additional facilities, Mark Edson Dam and Lake Angela,

located in El Dorado and Nevada Counties respectively, with the potential to impact the Placer County planning area. Of the 54 dams, 14 are rated as High Hazard, 23 as Significant Hazard, and 17 as Low Hazard.

There are several dams, which, if they fail, may impact the people and resources of Placer County. Twelve dams in Placer County are at least 75 feet tall or have a capacity of 10,000 acre-feet of water. Failure of any one of these dams would flood downstream areas and could cause loss of life and property. Both unincorporated and incorporated areas of the County are identified on dam failure inundation maps prepared for the County. The inundation areas for each of the dams are generally downstream and include large rural and urban areas on the valley floor below the dams.

Table 4.9 identifies the 54 dams located in the Placer County planning area. Figure 4.13 illustrates the locations of identified dams.

Table 4.9. Dams with Potential to Cause Damaging Floods in Placer County

Name	Owner	River	Nearest City to Dam	Distance to Nearest City (mi)	Structural Height of Dam (ft)	Maximum Storage of Dam (acre-ft)
Folsom Dike 1	DOI Br	North Fork American River Os	Hidden Valley	1	25	1,120,000
Folsom Dike 5	DOI Br	North Fork American River Os	Folsom	1	100	1,120,000
Lake Tahoe	DOI Br	Truckee River	Truckee	17	18	840,000
Combie	Nevada Irrigation Dist.	Bear River	Magnolia	3	-	8,773
Sugar Pine	DOI Br	North Shirttail Creek	None	-	205	10,964
Folsom Dike 2	DOI Br	North Fork American River Os	Hidden Valley	1	15	1,120,000
Folsom Dike 3	DOI Br	North Fork American River Os	Hidden Valley	1	10	1,120,000
Folsom Dike 4	DOI Br	North Fork American River Os	Folsom	1	30	1,120,000
Folsom Dike 6	DOI Br	North Fork American River Os	Folsom	1	40	1,120,000
French Meadows	Placer County Water Agency	Middle Fork American River	Auburn	40	231	134,000
Hell Hole	Placer County Water Agency	Rubicon River	Auburn	30	410	208,000
Rollins	Nevada Irrigation Dist.	Bear River	Meadow Vista	12	228	66,000

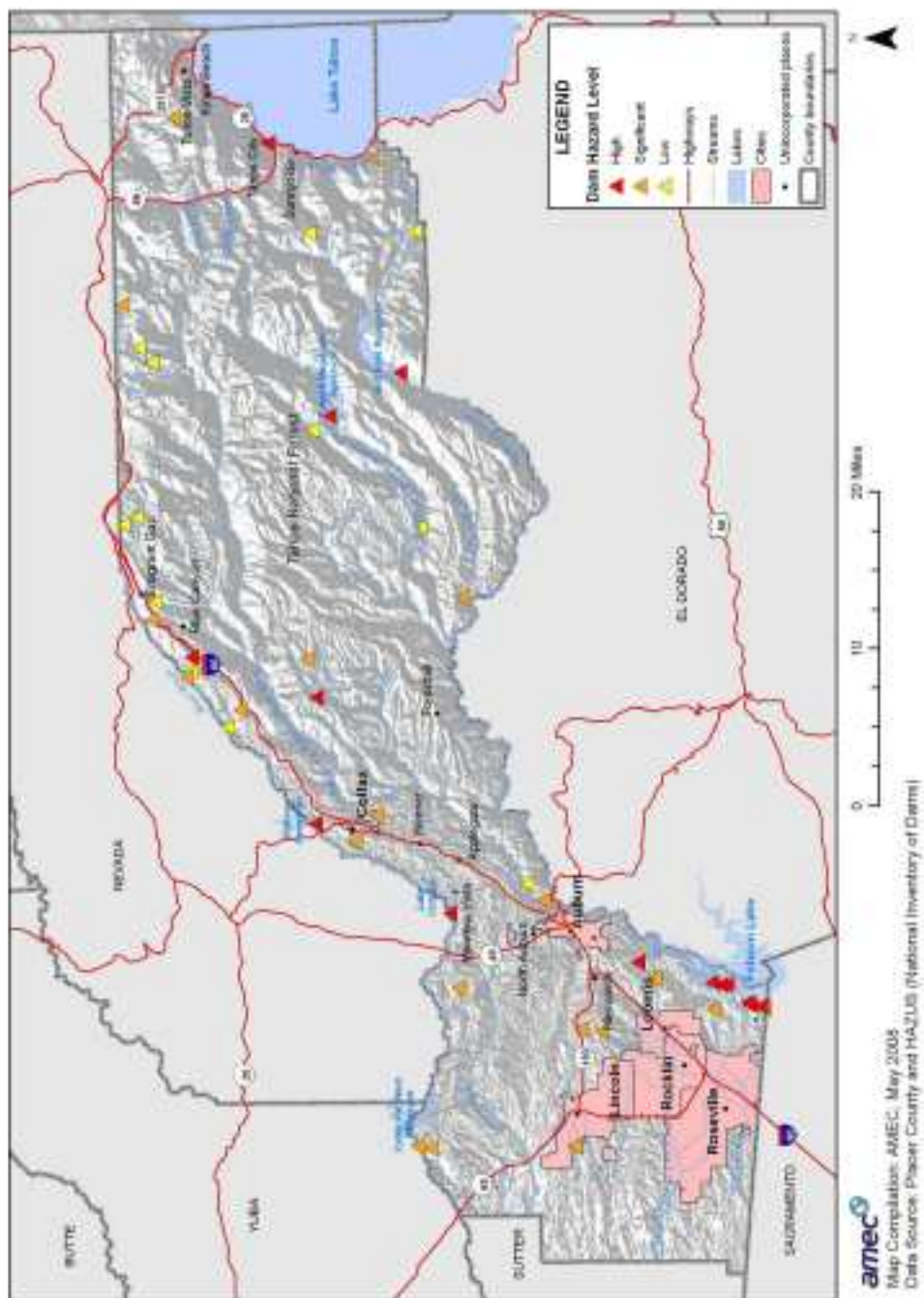
Name	Owner	River	Nearest City to Dam	Distance to Nearest City (mi)	Structural Height of Dam (ft)	Maximum Storage of Dam (acre-ft)
Drum Forebay	Pacific Gas and Electric	Drum Canal	Baxter	3	65	621
Wise Forebay	Pacific Gas and Electric	Auburn Ravine	Auburn	3	20	32
Ice Lakes	Sierra Lakes Co Water Dist.	Serena Creek	Soda Springs	2	-	340
Snowflower	Naco West of California	Kelly Creek	Auburn	42	-	380
City Of Lincoln Wwtp	City of Lincoln	Tr Markham Ravine	Lincoln	2	-	454
City Of Lincoln # 2	City of Lincoln	Tr Markham Ravine	Lincoln	1	21	301
North Fork Dam	Cespk	North Fork American River	Folsom	22	155	14,700
Duncan Creek Diversion	Placer County Water Agency	Duncan Creek	Auburn	40	32	20
Middle Fork Interbay	Placer County Water Agency	Middle Fork American River	Auburn	30	71	170
Buck Island Main	Sacramento Municipal Util.	Rockbound Creek	Coloma	45	22	1,070
Buck Island Auxiliary	Sacramento Municipal Util.	Rockbound Creek	Coloma	45	25	1,070
Dutch Flat Forebay	Nevada Irrigation Dist.	Dutch Flat Canal	Meadow Vista	19	105	180
Upper Rock Lake Main	Pacific Gas and Electric	Texas Creek	None	-	17	207
Upper Rock Lake Auxiliary	Pacific Gas and Electric	Texas Creek	None	-	9	207
Lower Rock Lake	Pacific Gas and Electric	Texas Creek	None	-	11	50
Lower Peak Lake Main	Pacific Gas and Electric	South Yuba River - Tr	Washington	25	31	484
Lower Peak Lake Auxiliary	Pacific Gas and Electric	South Yuba River - Tr	Washington	25	7	484
Kelly Lake	Pacific Gas and Electric	North Fork American River	Washington	8	24	360
Drum Afterbay	Pacific Gas and Electric	Bear River	None	-	104	341
Patterson Sec 29	Mrs. Virginia Patterson	Trib Bear River	Wheatland	5	22	151
Lake Alta Dam	Placer County Water Agency	Tr Nfk American River	Dutch Flat	1	22	318
Christian Valley	Pac Gas and Electric	Sfk Dry Creek	Bowman	-	-	165
Mammoth Res	Placer County Water Agency	Offstream	Hidden Valley	4	23	150

Name	Owner	River	Nearest City to Dam	Distance to Nearest City (mi)	Structural Height of Dam (ft)	Maximum Storage of Dam (acre-ft)
Clover Valley	Placer County Water Agency	Tr Antelope Cr	Rocklin	5	-	53
Hinkle	San Juan Suburban Water Dist.	Tr American Rv	Orangevale	2	20	-
Putts Lake	Walter M Saunders Trust	Blue Canyon Cr	Blue Canyon	2	19	388
Quail Lake	Tahoe City PUD	Trib Lake Tahoe	Tahoma	2	14	160
Morning Star Res	De Anza Placer Gold Mining	North Forbes Cr	Auburn	30	-	2,000
Kokila	George & Donna Wieg Et Al	Tr Miners Ravine	Roseville	6	18	94
Lake Mary	Sugar Bowl Corporation	Tr Sfk Yuba Rv	Soda Springs	3	22	232
Spring Vy Ranch	Wayne Summers Et Ux	Tr Campbell Cr	Pinecroft	2	-	95
Reservoir A	North Star Comm Svc, Dist.	West Martis Cr	Truckee	5	-	216
Camp Far West Dv	South Sutter Water Dist.	Bear River	Rio Oso	12	-	425
Wastewater Storage	City of Colfax	Tr Smuthers Ravine	Illinois Town	1	-	248
Skyrocket	Meridian Gold Company	Littlejohn Creek	Copperopolis	3	-	-
Auburn Valley #	Golf Resources of Auburn	Trib Bear River	Auburn	4	39	270
City Of Lincoln # 4	City of Lincoln	Offstream		-	-	301
Kidd Lake Main	Pacific Gas and Electric	South Yuba River - Tr	Washington	25	43	1,520
Kidd Lake Auxiliary	Pacific Gas and Electric	South Yuba River - Tr	Washington	25	15	1,520
Upper Peak Lake	Pacific Gas and Electric	South Yuba River - Tr	Washington	25	39	1,740
Columbian	Ethel Mulligan	Tr Auburn Ravine	Lincoln	5	-	132
New Drum Afterbay	Pacific Gas and Electric	Bear River	Rio Oso	45	-	411

Source: Placer County and National Inventory of Dams

*One Acre Foot=326,000 gallons

Figure 4.13. Placer County Dams of Concern



Past Occurrences

According to the HMPC, there have been three dam failures in the area: **Others??**

- **Hell Hole Dam Failure** - In 1964 construction of the Hell Hole dam was underway and the contractor had stopped operations for the winter. A major storm event (rains) occurred during December 1964 causing the Hell Hole Reservoir to fill and since the dam was not completed, it failed sending a considerable amount of water towards Auburn. The water washed out a bridge on Highway 49 over the American River at the confluence of the North and Middle Forks and flooded a quarry. Due to the way the construction contract was worded, the contractor had to rebuild the dam at his own expense. As a result, Placer County incurred no costs related to this event. No claims for damages were filed against PCWA by either the quarry owner or the state.
- **1986 Auburn Coffey Dam Failure** - As a result of area flooding, the Coffey Dam at Auburn breached and partially washed away. The U.S. Bureau of Reclamation had designed the Coffey Dam for a controlled failure by building a soft earthen plug into the dam for this purpose. It appears the dam failed as designed.
- **August 2004 Ralston Dam Release Gate Break** - A broken release gate on Ralston Dam in the middle fork of the American River prompted the National Weather Service to issue a flash flood warning until 1 p.m. in Placer County. According to the PCWA, the gate near the Ralston Powerhouse malfunctioned at 6 a.m. The sudden release of water from Ralston Reservoir south of Auburn sent a “wall of water three to four-feet high” down the river. About 800 to 1,000 acre-feet of water were released, with flows peaking between 10-11 a.m. It was expected to reach Folsom Dam by 12 noon. Sheriff’s deputies and California Highway Patrol officers alerted campers in the Auburn State Recreation Area to move to higher ground. The CHP was monitoring the muddy water as it approached Highway 49. There were no immediate reports of injuries or damage along the river, which is popular with rafters, kayakers and residents fleeing the summer heat.

Likelihood of Future Occurrences

Occasional—The County remains at risk to dam failures from numerous dams under a variety of ownership and control and of varying ages and conditions. Given the number and types of dams in the County and the history of past dam failures, the potential exists for future dam failures in the Placer County planning area.

4.2.10 Drought

Hazard/Problem Description

Drought is a gradual phenomenon. Although droughts are sometimes characterized as emergencies, they differ from typical emergency events. Most natural disasters, such as floods or forest fires, occur relatively rapidly and afford little time for preparing for disaster response.

Droughts occur slowly, over a multi-year period, and it is often not obvious or easy to quantify when a drought begins and ends.

Drought is a complex issue involving many factors—it occurs when a normal amount of moisture is not available to satisfy an area’s usual water-consuming activities. Drought can often be defined regionally based on its effects:

- **Meteorological** drought is usually defined by a period of below average water supply.
- **Agricultural** drought occurs when there is an inadequate water supply to meet the needs of the state’s crops and other agricultural operations such as livestock.
- **Hydrological** drought is defined as deficiencies in surface and subsurface water supplies. It is generally measured as streamflow, snowpack, and as lake, reservoir, and groundwater levels.
- **Socioeconomic** drought occurs when a drought impacts health, well-being, and quality of life, or when a drought starts to have an adverse economic impact on a region.

The California Department of Water Resources (DWR) says the following about drought:

One dry year does not normally constitute a drought in California. California’s extensive system of water supply infrastructure—its reservoirs, groundwater basins, and inter-regional conveyance facilities—mitigates the effect of short-term dry periods for most water users. Defining when a drought begins is a function of drought impacts to water users. Hydrologic conditions constituting a drought for water users in one location may not constitute a drought for water users elsewhere, or for water users having a different water supply. Individual water suppliers may use criteria such as rainfall/runoff, amount of water in storage, or expected supply from a water wholesaler to define their water supply conditions.

The drought issue in California is further compounded by water rights. Water is a commodity possessed under a variety of legal doctrines. The prioritization of water rights between farming and federally protected fish habitats in California is part of this issue.

Drought impacts are wide-reaching and may be economic, environmental, and/or societal. The most significant impacts associated with drought in the planning area are those related to water intensive activities such as agriculture, wildfire protection, municipal usage, commerce, tourism, recreation, and wildlife preservation. Also, during a drought, allocations go down, which results in reduced water availability. Voluntary conservation measures are typically implemented during extended droughts. A reduction of electric power generation and water quality deterioration are also potential problems. Drought conditions can also cause soil to compact and not absorb water well, potentially making an area more susceptible to flooding.

Past Occurrences

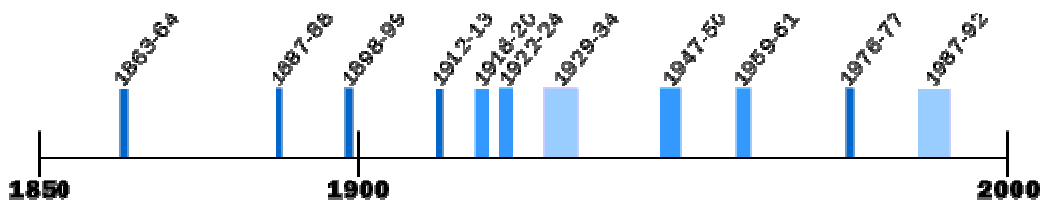
Historically, California has experienced multiple severe droughts. According to the DWR, droughts exceeding three years are relatively rare in Northern California, the source of much of the state's developed water supply. The 1929-34 drought established the criteria commonly used in designing storage capacity and yield of large Northern California reservoirs. Table 4.10 compares the 1929-34 drought in the Sacramento and San Joaquin Valleys to the 1976-77 and 1987-92 droughts (California's most recent multi-year drought). The driest single year of California's measured hydrologic record was 1977. Figure 4.14 depicts California's Multi-Year Historical Dry Periods, 1850-2000.

Table 4.10. Severity of Extreme Droughts in the Sacramento and San Joaquin Valleys

Drought Period	Sacramento Valley Runoff		San Joaquin Valley Runoff	
	(maf*/yr)	(percent Average 1901-96)	(maf*/yr)	(percent Average 1906-96)
1929-34	9.8	55	3.3	57
1976-77	6.6	37	1.5	26
1987-92	10.0	56	2.8	47

Source: California Department of Water Resources, www.water.ca.gov/
*Million acre feet

Figure 4.14. California's Multi-Year Historical Dry Periods, 1850-2000



Source: California Department of Water Resources, www.water.ca.gov/
Notes: Dry periods prior to 1900 estimated from limited data; covers dry periods of statewide or major regional extent

The HMPC identified the following droughts as having significant impacts on the planning area: What are the affects of the current drought??

- **1977** - A federal disaster declaration was declared as a result of a drought affecting Placer and surrounding counties. The Placer County Water Agency (PCWA) declared a water shortage and restricted water use for both irrigation and treated water users. The restrictions included a 50 percent reduction in water usage by customers and rate increases. This shortage lasted until January 1978 when the board terminated the water shortage restrictions.
- **1988** - The next water shortage occurred in 1988. Again the PCWA board passed a resolution declaring a water emergency. All customers had their water use reduced by 25 percent and rates were again increased for excessive usage. The countywide emergency prohibited

washing of sidewalks, driveways, parking lots and other hard surfaces, restricted the washing of vehicles, airplanes, and trailers to 3 gallons of water, prohibited fire hydrant flushing and drills, prohibited filling of pools, and prohibited new agricultural land irrigation.

- **1991** - The most recent drought emergency declared by the PCWA board was in February 1991. Raw water customers had their water usage reduced by 50 percent annually and by 25 percent seasonally. Treated water users were given most of the same restrictions and prohibitions as in 1988. Due to a very late storm season, the emergency was lifted by April 1991.

No hard costs for these emergencies were identified, although PCWA did incur increased operating costs and extra expenses along with an effect on revenue.

The map that follows provides a “snapshot in time” perspective of the current drought conditions during August of 2004. According to the U.S. Drought Monitor, most of Placer County is currently designated a D0 region, and is considered abnormally dry. This map illustrates that Placer County continues to be subject to drought conditions. The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. This map considers several factors including the Palmer Drought Index, Soil Moisture Models, USGS Weekly Streamflows, Standardized Precipitation Index, and Satellite Vegetation Health Index.

Figure 4.15 provides a “snapshot in time” of the drought conditions in California in April 2009 from the National Drought Mitigation Center. Placer County’s drought conditions varied from abnormally dry to severe. This map considers several factors, including the Palmer Drought Index, Soil Moisture Models, U.S. Geological Survey Weekly Streamflows, Standardized Precipitation Index, and Satellite Vegetation Health Index.

Figure 4.15. U.S. Drought Monitor, March 18, 2008

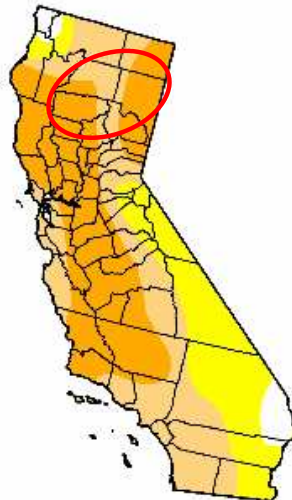
U.S. Drought Monitor California

April 28, 2009
Valid 7 a.m. EST

	Drought Conditions (Percent Area)					
	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	3.6	96.4	73.0	38.8	0.0	0.0
Last Week (04/21/2009 map)	3.6	96.4	73.0	38.8	0.0	0.0
3 Months Ago (02/03/2009 map)	0.8	99.2	89.4	54.7	19.0	0.0
Start of Calendar Year (01/06/2009 map)	1.7	98.3	88.2	41.3	2.8	0.0
Start of Water Year (10/07/2008 map)	0.0	100.0	95.9	55.0	0.0	0.0
One Year Ago (04/29/2008 map)	7.3	92.7	45.7	9.3	0.0	0.0

Intensity:

D0 Abnormally Dry	D3 Drought - Extreme
D1 Drought - Moderate	D4 Drought - Exceptional
D2 Drought - Severe	



The Drought Monitor focuses on broad-scale conditions.
Local conditions may vary. See accompanying text summary
for forecast statements

<http://drought.unl.edu/dm>



Released Thursday, April 30, 2009
Author: Brad Rippey, U.S. Department of Agriculture

Likelihood of Future Occurrences

Occasional—Historical drought data for the Placer County planning area and region indicate there have been three significant droughts in the last 79 years. This equates to a drought every 26.3 years on average or a 3.8 percent chance of a drought in any given year. Based on this data, droughts will occasionally affect the planning area.

4.2.11 Earthquake

Hazard/Problem Description

An earthquake is caused by a sudden slip on a fault. Stresses in the earth's outer layer push the sides of the fault together. Stress builds up, and the rocks slip suddenly, releasing energy in waves that travel through the earth's crust and cause the shaking that is felt during an earthquake. The amount of energy released during an earthquake is usually expressed as a magnitude and is

measured directly from the earthquake as recorded on seismographs. Another measure of earthquake severity is intensity. Intensity is an expression of the amount of shaking at any given location on the ground surface (see Table 4.11). Seismic shaking is typically the greatest cause of losses to structures during earthquakes.

Table 4.11. Modified Mercalli Intensity (MMI) Scale

MMI	Felt Intensity
I	Not felt except by a very few people under special conditions. Detected mostly by instruments.
II	Felt by a few people, especially those on upper floors of buildings. Suspended objects may swing.
III	Felt noticeably indoors. Standing automobiles may rock slightly.
IV	Felt by many people indoors; by a few outdoors. At night, some people are awakened. Dishes, windows, and doors rattle.
V	Felt by nearly everyone. Many people are awakened. Some dishes and windows are broken. Unstable objects are overturned.
VI	Felt by everyone. Many people become frightened and run outdoors. Some heavy furniture is moved. Some plaster falls.
VII	Most people are alarmed and run outside. Damage is negligible in buildings of good construction, considerable in buildings of poor construction.
VIII	Damage is slight in specially designed structures, considerable in ordinary buildings, and great in poorly built structures. Heavy furniture is overturned.
IX	Damage is considerable in specially designed buildings. Buildings shift from their foundations and partly collapse. Underground pipes are broken.
X	Some well-built wooden structures are destroyed. Most masonry structures are destroyed. The ground is badly cracked. Considerable landslides occur on steep slopes.
XI	Few, if any, masonry structures remain standing. Rails are bent. Broad fissures appear in the ground.
XII	Virtually total destruction. Waves are seen on the ground surface. Objects are thrown in the air.

Source: Multi-Hazard Identification and Risk Assessment, FEMA 1997

Seismic Hazards

Earthquakes can cause structural damage, injury, and loss of life, as well as damage to infrastructure networks, such as water, power, gas, communication, and transportation. Earthquakes may also cause collateral emergencies including dam and levee failures, seiches, hazmat incidents, fires, avalanches, and landslides. The degree of damage depends on many interrelated factors. Among these are the magnitude, focal depth, distance from the causative fault, source mechanism, duration of shaking, high rock accelerations, type of surface deposits or bedrock, degree of consolidation of surface deposits, presence of high groundwater, topography, and the design, type, and quality of building construction. This section briefly discusses issues related to types of seismic hazards.

Ground Shaking

When movement occurs along a fault, the energy generated is released as waves which cause ground shaking. Ground shaking intensity varies with the magnitude of the earthquake, the

distance from the epicenter, and the type of rock or sediment through which the seismic waves move. The geological characteristics of an area thus can be a greater hazard than its distance to the earthquake epicenter.

Seismic Structural Safety

Older buildings constructed before building codes were established, and even newer buildings constructed before earthquake-resistance provisions were included in the codes, are the most likely to be damaged during an earthquake. Buildings one or two stories high of wood-frame construction are considered to be the most structurally resistant to earthquake damage. Older masonry buildings without seismic reinforcement (unreinforced masonry) are the most susceptible to the type of structural failure that causes injury or death.

The susceptibility of a structure to damage from ground shaking is also related to the underlying foundation material. A foundation of rock or very firm material can intensify short-period motions which affect low-rise buildings more than tall, flexible ones. A deep layer of water-logged soft alluvium can cushion low-rise buildings, but it can also accentuate the motion in tall buildings. The amplified motion resulting from softer alluvial soils can also severely damage older masonry buildings.

Other potentially dangerous conditions include, but are not limited to: building architectural features that are not firmly anchored, such as parapets and cornices; roadways, including column and pile bents and abutments for bridges and overcrossings; and above-ground storage tanks and their mounting devices. Such features could be damaged or destroyed during strong or sustained ground shaking.

Liquefaction Potential

Liquefaction is a process whereby soil is temporarily transformed to a fluid form during intense and prolonged ground shaking. Areas most prone to liquefaction are those that are water saturated (e.g., where the water table is less than 30 feet below the surface) and consist of relatively uniform sands that are loose to medium density. In addition to necessary soil conditions, the ground acceleration and duration of the earthquake must be of sufficient energy to induce liquefaction.

Liquefaction during major earthquakes has caused severe damage to structures on level ground as a result of settling, tilting, or floating. Such damage occurred in San Francisco on bay-filled areas during the 1989 Loma Prieta earthquake, even though the epicenter was several miles away. If liquefaction occurs in or under a sloping soil mass, the entire mass may flow toward a lower elevation. Also of particular concern in terms of developed and newly developing areas are fill areas that have been poorly compacted.

Settlement

Settlement can occur in poorly consolidated soils during ground shaking. During settlement, the soil materials are physically rearranged by the shaking to result in a less stable alignment of the individual minerals. Settlement of sufficient magnitude to cause significant structural damage is normally associated with rapidly deposited alluvial soils or improperly founded or poorly compacted fill. These areas are known to undergo extensive settling with the addition of irrigation water, but evidence due to ground shaking is not available.

Other Hazards

Earthquakes can also cause seiches, landslides, and dam failures. A seiche is a periodic oscillation of a body of water resulting from seismic shaking or other factors that could cause flooding. Earthquake-induced seiches are considered a risk at Lake Tahoe in eastern Placer County, and are discussed separately in Section 4.2.18. Earthquakes may cause landslides, particularly during the wet season, in areas of high water or saturated soils. The most likely areas for earthquake-induced landslides are the same areas of high landslide potential discussed in Section 4.2.15 Landslide. Finally, earthquakes can cause dams to fail (see Section 4.2.9 Dam Failure).

Faults

An active fault is defined by the California Geological Survey as one that has had surface displacement within the last 11,000 years (Holocene). This does not mean, however, that faults having no evidence of surface displacement within the last 11,000 years are necessarily inactive. For example, the 1975 Oroville earthquake, the 1983 Coalinga earthquake, and the 1987 Whittier Narrows earthquake occurred on faults not previously recognized as active. Potentially active faults are those that have shown displacement within the last 1.6 million years (Quaternary). An inactive fault shows no evidence of movement in historic (last 200 years) or geologic time, suggesting that these faults are dormant.

Placer County Earthquake Hazards

Placer County lies between two seismically active regions in the western United States. Tectonic stresses associated with the North American-Pacific Plate boundary can generate damaging earthquakes along faults 30 to 100 miles to the west of the County. Extreme eastern Placer County borders the Basin and Range province that entails most of Nevada and western Utah. This area is riddled with active faults that are responsible for and form the boundary between each basin or valley and the neighboring mountain range.

The closest recently active fault in the western Sierra Nevada foothills is the Cleveland Hills fault, which is situated approximately 36 miles northwest of Auburn. Another potential earthquake source is the Midland Fault Zone on the western side of the Sacramento Valley. This was the source of the 1892 Vacaville-Winters earthquake.

Placer County itself is traversed by a series of northwest-trending faults, called the Foothill Fault Zone, that are related to the Sierra Nevada uplift. This was the source of Oroville's 1975 earthquake (and an earlier event in the 1940s). Subsequent research of these events led to the identification and naming of the zone and questions about the siting and design of the proposed Auburn Dam. Earthquakes on nearby fault segments in the zone could be the source of ground shaking in the Placer County planning area.

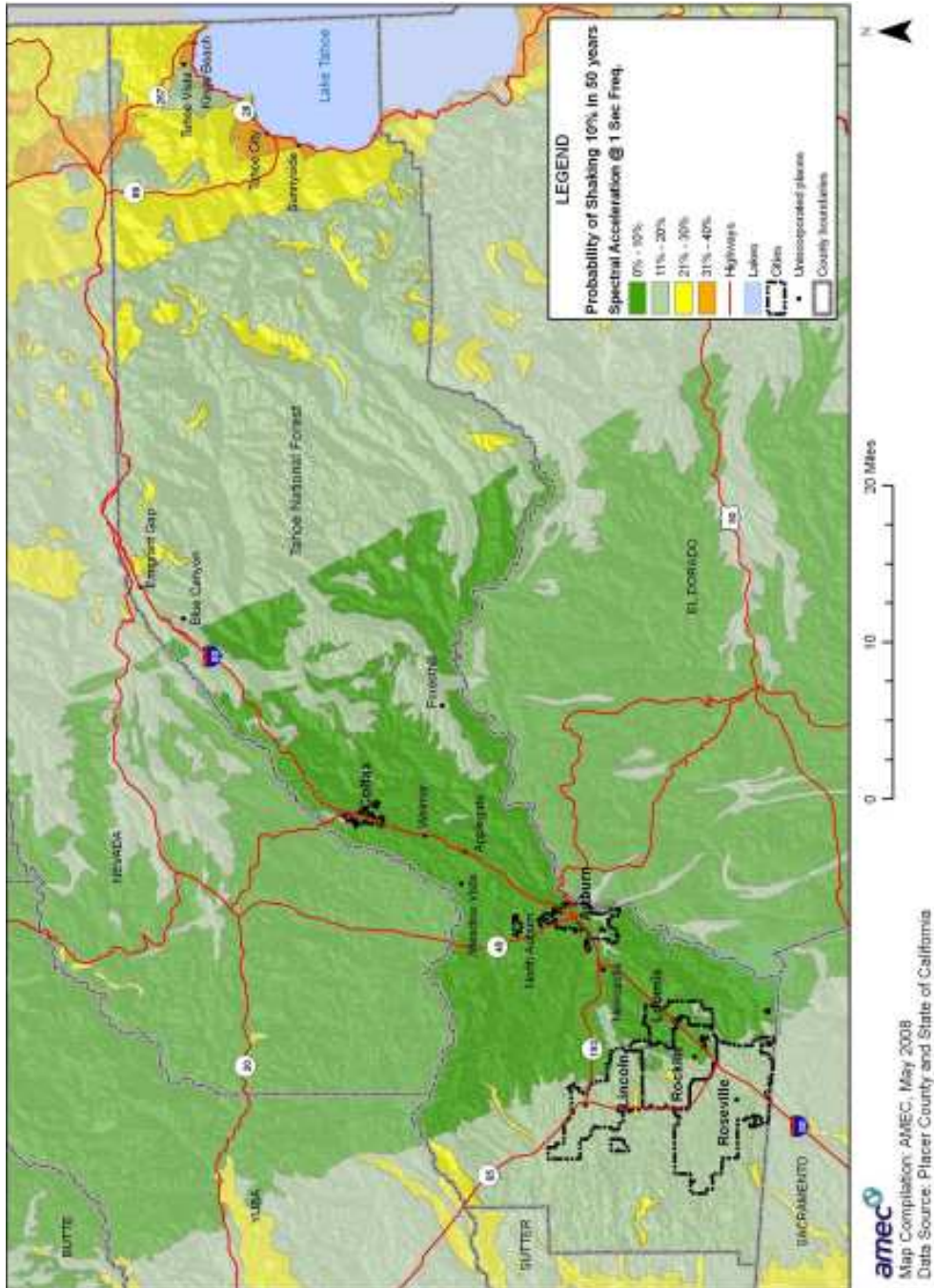
Although portions of western and eastern Placer County are located in a seismically active region, no known faults actually go through any of the cities or towns. However, the Bear Mountain and the Melones faults are situated approximately three to four miles west and east of the City of Auburn respectively. Earthquakes on these two faults would have the greatest potential for damaging buildings in Auburn, especially the unreinforced masonry structures in the older part of the city and homes built before 1960 without adequate anchorage of framing and foundations. Similar lower magnitude but nearby earthquakes are capable of producing comparable damages in other Placer County communities.

To the east in Nevada, there are several faults associated with a series of earthquakes in 1954, especially the major (7.1 Richter magnitude) December 16, 1954 Fairview Peak event (about 100 miles east of Carson City).

Further analysis using FEMA's HAZUS-MH (nationally applicable loss estimation software) shows that there are several potentially active faults east of the Placer County line in Nevada. The closest faults and estimated maximum earthquakes are the North Tahoe Fault (6.5 estimated maximum magnitude), Incline Village Fault (6.5 estimated maximum magnitude), and the East Tahoe Fault (7.0 estimated maximum magnitude).

Additionally, western Placer County may experience ground shaking from distant major to great earthquakes on faults to the west and east. For example, to the west, both the San Andreas fault (source of the 8.0 estimated Richter magnitude San Francisco earthquake that caused damage in Sacramento in 1906, including the State Capitol, the full extent of which was not discovered until the mid-1970s) and the closer Hayward fault have the potential for experiencing major to great events. The US Geological Survey recently (February 2004) estimated that there is a 62 percent probability of at least one 6.7 or greater magnitude earthquake occurring that could cause widespread damage in the greater San Francisco Bay area before 2032.

Figure 4.16 is an earthquake shaking map of Placer County that is based on analyses of faults, soils, topography, groundwater, and the potential for earthquake shaking sufficiently strong to trigger landslide and liquefaction. The warm yellow lines indicate damaging levels of shaking. The eastern portion of the Placer County planning area would likely experience the greatest levels of shaking and damage.



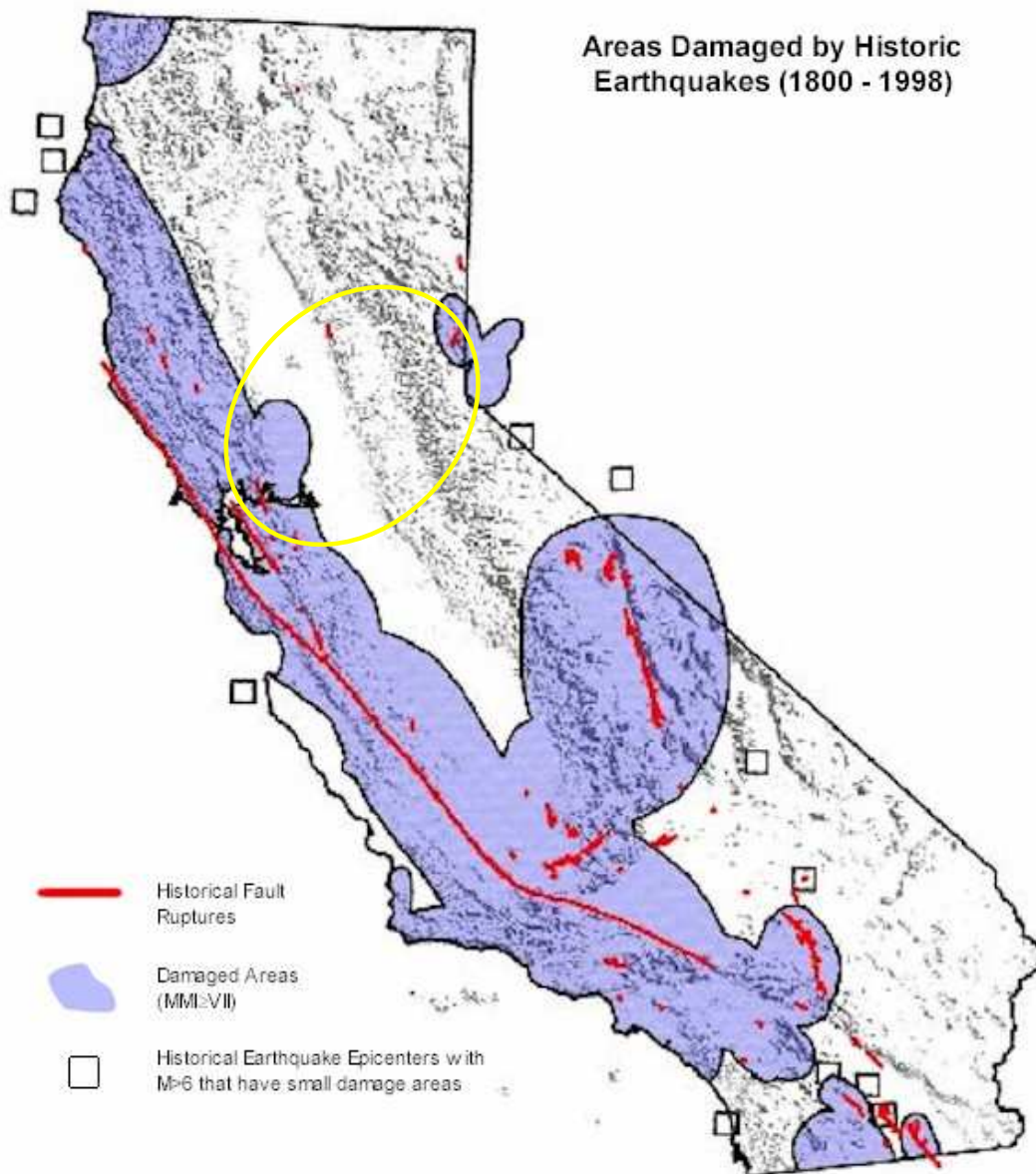
Past Occurrences

Historically, major earthquakes have not been an issue for Placer County. However, minor earthquakes have occurred in the County in the past. Figure 4.7 illustrates areas of California damaged by earthquakes between 1800 and 1998. The HMPC has identified several earthquakes that were felt by area residents and/or caused damaging shaking in Placer County. Details on some of these events follow. Others??

- **1892** – The Midland Fault Zone, the source of an 1892 earthquake centered between the cities of Vacaville and Winters, caused minor damage in the City of Lincoln.
- **1908** – An estimated 4.0+ Richter magnitude earthquake occurred between Auburn and Folsom with an epicenter possibly associated with the Bear Mountain fault.
- **1975** – The Cleveland Hills fault was the source of the Oroville earthquake (Richter Magnitude: 5.7), which was felt strongly in Placer County and neighboring areas.
- **2003/2004** – Volcanic magma (molten rock) migrating about 20 miles below the surface of the Sierra Nevada mountains caused a swarm of about 1,600 small earthquakes in late 2003 and early 2004. The 20 mile depth is about twice as deep as earthquakes caused by normal faulting in the region measured during the last 30 years. Placer County did not report any damages associated with these small earthquakes.

Since February of 2008, more than 600 earthquakes of magnitude greater than 1.0 have been recorded in the nearby Reno, Nevada area. The most powerful, a magnitude 4.7, hit Reno on April 25, 2008 causing minor damage locally. It is unknown to what extent these or other earthquakes occurring outside of the planning area were felt by Placer County residents.

Figure 4.17. Areas Damaged by Historical Earthquakes, 1800-1998



Source: California Geological Survey, www.consrv.ca.gov/CGS/rghm/psha/ofr9608/index.htm#Faults%20in%20California

Likelihood of Future Occurrences

Occasional— Placer County's Safety Element notes that there is a high potential that the area will be subject to at least moderate earthquake shaking one or more times over the next century. As discussed above, Placer County could be affected by earthquake activity from several local and regional fault systems.

4.2.12 Flood

Hazard/Problem Description

Floods are among the most frequent and costly natural disasters in terms of human hardship and economic loss and are often caused by severe weather events. Floods can cause substantial damage to structures, landscapes, and utilities as well as life safety issues. Certain health hazards are also common to flood events. Standing water and wet materials in structures can become breeding grounds for microorganisms such as bacteria, mold, and viruses. This can cause disease, trigger allergic reactions, and damage materials long after the flood. When floodwaters contain sewage or decaying animal carcasses, infections become a concern. Direct impacts, such as drowning, can be limited with adequate warning and public education about what to do during floods. Where flooding occurs in populated areas, warning and evacuation will be of critical importance to reduce life and safety impacts from any type of flooding.

The area adjacent to a channel is the floodplain. Floodplains are illustrated on inundation maps, which show areas of potential flooding and water depths. In its common usage, the floodplain most often refers to that area that is inundated by the 100-year flood, the flood that has a one percent chance in any given year of being equaled or exceeded. The 100-year flood is the national minimum standard to which communities regulate their floodplains through the National Flood Insurance Program. The 500-year flood is the flood that has a 0.2 percent chance of being equaled or exceeded in any given year. The potential for flooding can change and increase through various land use changes and changes to land surface, which result in a change to the floodplain. A change in environment can create localized flooding problems inside and outside of natural floodplains by altering or confining natural drainage channels. These changes are most often created by human activity.

The Placer County planning area is susceptible to various types of flood events as described below.

- **Riverine flooding** – Riverine flooding, defined as when a watercourse exceeds its “bank-full” capacity, generally occurs as a result of prolonged rainfall, or rainfall that is combined with already saturated soils from previous rain events. This type of flood occurs in river systems whose tributaries may drain large geographic areas and include one or more independent river basins. The onset and duration of riverine floods may vary from a few hours to many days. Factors that directly affect the amount of flood runoff include precipitation amount, intensity and distribution, the amount of soil moisture, seasonal

variation in vegetation, snow depth, and water-resistance of the surface due to urbanization. In the Placer County planning area, riverine flooding is largely caused by heavy and continued rains, often combined with snowmelt, increased outflows from upstream dams, and heavy flow from tributary streams. These intense storms can overwhelm the local waterways as well as the integrity of flood control structures. The warning time associated with slow rise floods assists in life and property protection.

- **Flash flooding** – Flash flooding describes localized floods of great volume and short duration. This type of flood usually results from a heavy rainfall on a relatively small drainage area. Precipitation of this sort usually occurs in the winter and spring. Flash floods often require immediate evacuation within the hour.
- **Localized flooding** – Localized flooding problems are often caused by flash flooding, severe weather, or an unusual amount of rainfall. Flooding from these intense weather events usually occurs in areas experiencing an increase in runoff from impervious surfaces associated with development and urbanization as well as inadequate storm drainage systems.
- **Dam failure flooding** – Flooding from failure of one or more upstream dams is also a concern to the Placer County planning area. A catastrophic dam failure could easily overwhelm local response capabilities and require mass evacuations to save lives. Impacts to life safety will depend on the warning time and the resources available to notify and evacuate the public. Major loss of life could result, and there could be associated health concerns as well as problems with the identification and burial of the deceased. Dam failure is further addressed in Section 4.2.9 Dam Failure.

Placer County encompasses multiple rivers, streams, creeks, and associated watersheds. The County is situated in a region that dramatically drops in elevation from the eastern portion (Sierra Nevada) to the western portion, where excess rain on snow can contribute to downstream flooding. Damaging floods in Placer County occur primarily in the developed areas of the County extending westward from Colfax to Sacramento and Sutter Counties. Flood flows generally follow defined stream channels, drainages, and watersheds.

Various flood protection measures are either in place or planned to protect Placer County from future flood events. Existing flood protection measures include a comprehensive system of dams, levees, overflow weirs, pumping plants, channel improvements, floodway bypasses, detention and retention structures, and other improvements. In addition, both the Placer County Flood Control and Water Conservation District and the City of Roseville maintain a system of ALERT Flood Warning gages, including 28 precipitation gages and 22 stream level gages located throughout western Placer County that provide real time monitoring information on current flood conditions.

The Placer County Waterway System and Major Sources of Flooding

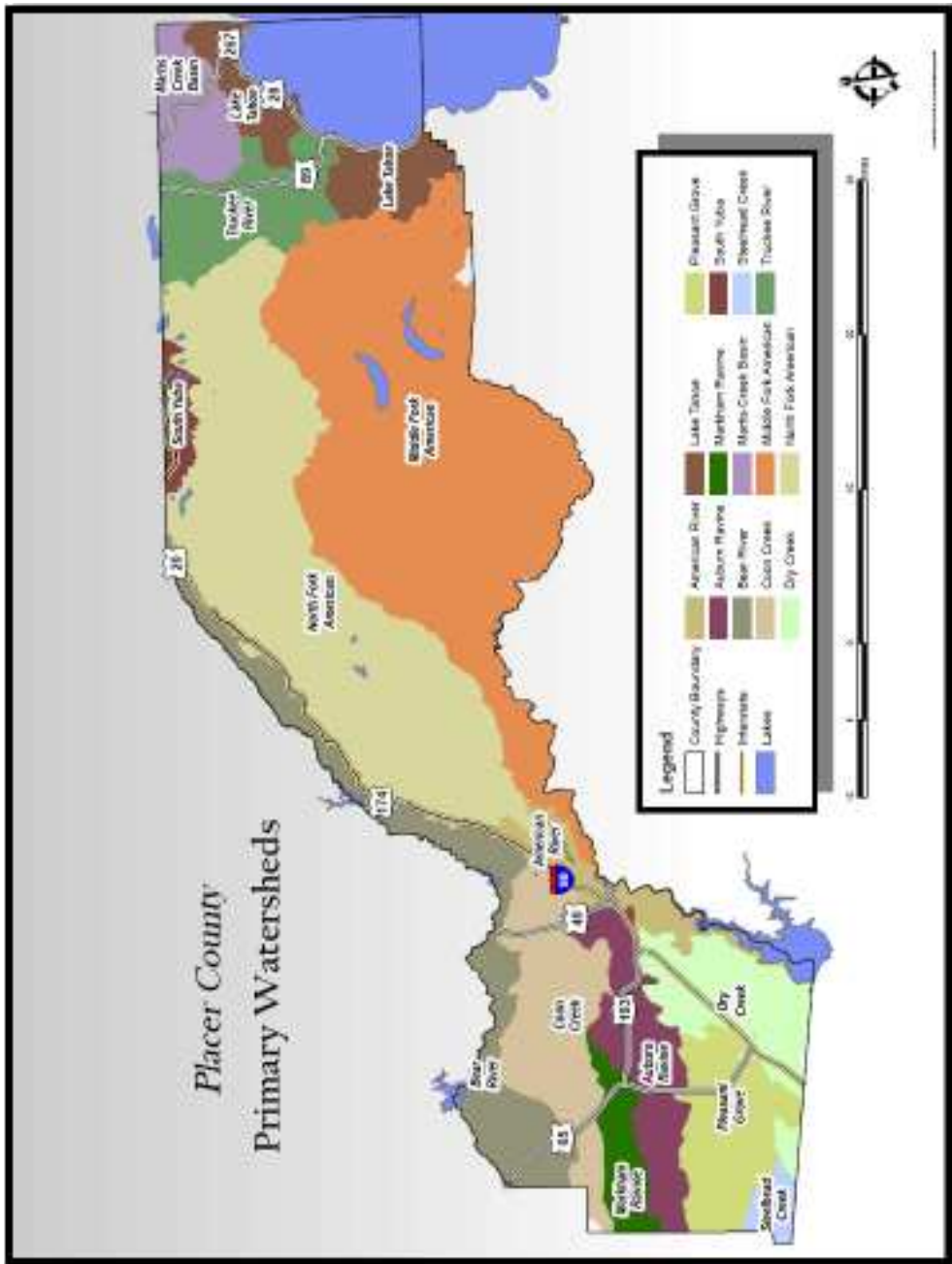
Placer County crosses 14 watersheds. The watersheds of Placer County include a combined drainage area of approximately 1,515 square miles. Of the 14 watersheds, there are four main

watersheds or areas that are the primary source of flooding within the County. These include the following watersheds as further described in the following paragraphs:

- Dry Creek Watershed
- Cross Canal Watershed
- Auburn/Bowman Area
- Truckee River Watershed

Figure 4.18 illustrates the primary watersheds of Placer County.

Figure 4.18. Primary Watersheds of Placer County



(Source: Placer County Website: http://www.placer.ca.gov/Departments/CommunityDevelopment/Planning/PlacerLegacy/~/_media/cdr/Planning/PlacerLegacy/PrimaryWatersheds.ashx)

Dry Creek Watershed. Dry Creek watershed encompasses approximately 116 square miles in Placer and Sacramento Counties. In Placer County the watershed is located in the southwestern portion of the County, and includes the City of Rocklin and Town of Loomis. The headwaters of Dry Creek are located in the upper portions of the Loomis Basin, in the vicinity of Penryn and Newcastle, in unincorporated Placer County, in the Granite Bay area near Folsom Lake, and in Orangevale in Sacramento County. The headwaters are located in the Sierra Nevada foothills at elevations of 900-1200 feet above msl. The mouth of Dry Creek, at its confluence with the Natomas East Main Drainage Canal, is at an elevation of about 30 feet above msl. Major tributaries to Dry Creek include Antelope Creek, Clover Valley Creek, Secret Ravine, Miners Ravine, Strap Ravine Creek, Linda Creek, and Cirby Creek. Dry Creek drains to Steelhead Creek. Land use in the Dry Creek watershed varies widely, from agricultural to residential to commercial. The watershed is located in an area of rapid urbanization and population growth.

Incidences of flooding along Dry Creek and its tributaries are well documented. Floods in the Dry Creek watershed occur from October through April. The major flooding problems within this drainage basin occur where the north and south branches of Dry Creek converge. Flooding occurs when heavy rains and saturated soils cause streams to overflow their banks, flooding property and structures located adjacent to the streams. Streams also back up at culverts and bridges, blocking roads or making them unsafe. Continued development in both the upper and lower reaches of the watershed will likely make flooding problems worse.

According to the 1992 Dry Creek Watershed Flood Control Plan, substantial flood damages will continue to occur under existing conditions. Areas with the most extensive and frequent damages include areas along Miners Ravine in the vicinity of Joe Rodgers Road and upstream of Sierra College Boulevard; Paragon Court near Antelope Creek in Rocklin; and areas along Cirby, Linda and Dry Creeks in Roseville. Some of these same areas are susceptible to flooding from storms as frequent as the 10-year storm. Many of the bridges and culverts in the watershed are inadequate to pass the 100-year event (70 percent). Nearly 50 percent of the stream crossings are inadequate for even the 25-year flood. Based on 1989 land use, structures that will be impacted by the 100-year flood are essentially those that were flooded by the February 1986 flood.

Floods generally caused by a combination of prolonged rainfall leading to saturated soils and a short period of intense precipitation occur from October through April. Dry Creek and its tributaries have an extensive record of historic flood, especially in the Roseville area. According to the 1992 report, damaging floods occurred in December 1955, April 1958, October 1962, December 1964, March 1983, and February 1986. The 1983, 1986 and 1995 floods were the largest and most damaging on record.

Cross Canal Watershed (Auburn Ravine/Coon Creek/Pleasant Grove Creek/Markham Ravine/Curry Creek). This watershed encompasses approximately 69,919.42 acres or 282.96 square kilometers, and includes 6 dams. Auburn Ravine, Markham Ravine, Coon Creek, Pleasant Grove Creek, Curry Creek, and their tributaries drain approximately 292 square miles of northwestern and southeastern Sutter County (88 percent in Placer County and 12 percent in

Sutter County) and are referred to as the Cross Canal Watershed. The Cross Canal, at the western portion of the watershed, carries the combined flow of the creeks to the Sacramento River. The watershed slopes from east to west with elevations ranging from 2,500 feet to 25 feet. The eastern portion of the watershed is located in the foothills of the Sierra Nevada. Stream channels in this area have slopes of several hundred feet per mile. The eastern portion of the watershed is typified by the much flatter land of the Central Valley. Stream channels in this area have slopes of a few feet per mile. The City of Lincoln and portions of the Cities of Auburn, Rocklin, and Roseville are located within the watershed.

An extensive area upstream of the Cross Canal, in eastern Sutter County and western Placer County, is subject to periodic flooding. Major flooding in the watershed occurs as ponding and overland flow over many square miles of land east of the Cross Canal. Flooding also occurs adjacent to tributary streams where channel capacities are exceeded. Inadequately sized road crossings, land leveling, and channelization within the lower portion of the watershed have likely contributed to the frequency and degree of flooding. Future development in the watershed may also contribute to the flooding issue. The affected flooding area appears to be between 10,000 to 30,000 acres including the tributary streams. The Sutter-Placer Watershed Area Study by the Soil Conservation Service estimated approximately 31,000 acres of the watershed would be inundated during a 100-year frequency flood event. Approximately 95 percent of the potentially flooded area is west of Highway 65, in the flatter portion of the watershed. During major flooding, inundation along the individual streams combines upstream of the Cross Canal to form a continuous body of water approximately 10 miles by 3 miles. Several roads in the western portion of the watershed flood once or more each year on the average (Placer County Water Agency 2001). Several elements contribute to major flooding in the watershed including limited channel capacity, undersized bridges and culverts, high river stages in the Sacramento River, and historical land leveling and channel modifications.

Auburn/Bowman Area. The Auburn/Bowman area is a largely rural area located in the Sierra foothills in Placer County. The area covers approximately 41.5 square miles and is contained in portions of six different drainage basins (or watersheds): Bear River – 2.1 square miles, Orr Creek – 9.3 square miles, Dry Creek – 15.5 square miles (including Rock Creek – 4.3 square miles), Auburn Ravine – 10.8 square miles (including North Ravine – 4.6 square miles), Mormon Ravine – 1.4 square miles, Dutch Ravine – 1.0 square miles, the American River (North Fork) – 9.8 square miles, and Deadman’s Canyon – 1.0 square miles. This area is characterized by relatively steep slopes and moderate relief. Elevations in the area range from approximately 800 feet above msl in the southern portion of the study area to over 2000 feet above msl in upper Dry Creek and Orr Creek watersheds. Overall, most of the Auburn/Bowman area has elevations ranging from 1000 to 1500 feet above msl.

Flooding occurs when heavy rains cause streams to overflow their banks, flooding property and structures located adjacent to the stream. Streams also back up at culverts and bridges, blocking roads or otherwise making them unsafe. Emergency services can also be restricted by the flooded roads. In addition, there are numerous open canals in the study area which can intercept sheet

runoff from one area and spill it into another. Excessive spills from these canals may also increase the potential for downstream flooding. According to the 1992 Auburn/Bowman Community Plan Hydrology Study, approximately 70 percent of the bridges and culverts in the watershed are inadequate to pass the 100-year flows for both existing and future conditions, and flooding will occur with the 100-year flood under existing conditions along Dry Creek Road. Specifically, flooding of up to two to three feet has been known to occur on Dry Creek Road between Dry Creek Road Bridge and Twin Pines Trail Bridge during a major storm event (e.g., March 1986). The flood of 1986 caused the most severe flooding damage to date in the Auburn/Bowman area. In addition to the overtopping of bridges and culverts, at several locations, flooding of structures occurred in the floodplains. Over 60 percent of the stream crossings are inadequate for even the 25-year flood.

Truckee River Watershed. The Truckee River watershed, with an area of approximately 2,720 square miles, encompasses the entire Lake Tahoe, Truckee River, and Pyramid Lake systems. The major tributaries to the Truckee River in California include Bear Creek, Squaw Creek, Cabin Creek, Pole Creek, Donner Creek, Trout Creek, Prosser Creek, the Little Truckee River, Gray Creek, and Bronco Creek. Roughly the middle third of the Truckee River watershed is located within Placer County, in eastern Sierra Nevada, north of Lake Tahoe. A significant portion of the watershed is above 6,000 ft.

The overflowing and diversion of Squaw Creek (upper Truckee River Basin), is responsible for major flooding events, such as the January floods of 1997, in eastern Placer County. In the more urbanized areas, flood problems are intensified by the increased volume of water that must be carried away by streams. The volume is increased because rooftops of new homes and other structures, as well as new streets, driveways, parking lots, and other paved areas all decrease the amount of open land available to absorb rainfall and runoff.

Localized Flooding Areas

Localized flooding also occurs throughout the County with several areas of primary concern. According to the Placer County Department of Public Works, numerous roads throughout the County are subject to flooding in heavy rains. In addition to flooding, damage to these areas during heavy storms includes pavement deterioration, washouts, landslides/mudslides, debris areas, and downed trees. The amount and type of damage or flooding that occurs varies from year to year, depending on the quantity of runoff. These areas and the types of damage are presented in the following table.

Table 4.12. Unincorporated Placer County Localized Flooding Areas

Localized Flood Areas
Industrial Avenue – south of Athens for approximately 600'
Raise road approximately 12"
P.F.E. Road – 1 mile west of Walerga Road
Deepen and clean out tributary, add another box culvert

Localized Flood Areas
Cook Riolo Road – south of Central Avenue
(note: new school)
Bianchi Estates – Muirwood Lane, Blackwood Lane, Kenwood Way
Storm drains need to be installed (note: \$1 million set aside, need \$3 million total)
Watt Avenue – south of Dyer Lane at cross culvert
Raise road, add culvert
Walerga Road Bridge at Dry Creek
Raise and replace
Auburn-Folsom Road – at Miners Ravine, and at Linda Creek south of Eureka Road
Barton Road – at Linda Creek north of Seven Cedars Place
Culvert needs to be replaced with two larger sized culverts
Dry Creek Road – at Black Oak Road
Raise road, install larger culvert
Dry Creek Road – between Greenstone Ct and Parkway Dr and along the south side of Northpark Sub.
Ayers Holmes Road – at box culvert crossing
Elevate road
Soda Springs Road – at Wabena Creek crossing
Replace or repair and reinstall culvert
Brewer Road – south of Jackson Road at two seasonal drain crossings
Clean seasonal drains
Locust Road – south of Jackson Road at one seasonal drain crossing
Clean seasonal drain
Landslide Areas
Old Foresthill Road – (note: recent fire could worsen severity)
Ophir Road (two sites) – (1)near Stonehouse Road and (2)near Wise Road
Yankee Jims Road – shoulder needs to be built up and road needs widening in some areas
Downed Trees Areas
Virginiatown Rd (Fowler Rd – Gold Hill Rd)
Fruitvale Road (Garden Bar Rd – Gold Hill Rd)
Fowler Road (Hwy 193 – Fruitvale Rd)
Mt. Pleasant Rd (Mt Vernon Rd – Crosby Harold Rd)
Mt. Vernon Road (Collins Dr – Wise Rd)
Gold Hill Road (Hwy 193 – Wise Rd)
Baxter Grade Road (Wise Rd – Mt. Vernon Rd)
Val Verde Road (Horseshoe Bar Rd – Wells Rd)
Auburn-Folsom Road (Auburn City Limits – King Rd)
Auburn-Folsom Road (Los Lagos – Douglas Blvd)
Wise Road (Ophir Rd – Garden Bar Rd)

Floodplain Mapping

FEMA established standards for floodplain mapping studies as part of the National Flood Insurance Program (NFIP). The NFIP makes flood insurance available to property owners in participating communities adopting FEMA-approved local floodplain studies, maps, and regulations. Floodplain studies that may be approved by FEMA include federally funded studies; studies developed by state, city, and regional public agencies; and technical studies generated by private interests as part of property annexation and land development efforts. Such studies may include entire stream reaches or limited stream sections depending on the nature and scope of a study. A general overview of floodplain mapping is provided in the following paragraphs. Details on the NFIP and mapping specific to participating jurisdictions are in Section 4.3 Vulnerability Assessment and in the jurisdictional annexes.

Flood Insurance Study (FIS)

The FIS develops flood-risk data for various areas of the community that will be used to establish flood insurance rates and to assist the community in its efforts to promote sound floodplain management. The current Placer County FIS is dated 2001. This study covers both the unincorporated and incorporated areas of the County.

Flood Insurance Rate Map (FIRM)

The FIRM is designed for flood insurance and floodplain management applications. For flood insurance, the FIRM designates flood insurance rate zones to assign premium rates for flood insurance policies. For floodplain management, the FIRM delineates 100- and 500-year floodplains, floodways, and the locations of selected cross sections used in the hydraulic analysis and local floodplain regulation. The County FIRMs will soon be replaced by new digital flood insurance rate maps (DFIRMs) as part of FEMA's Map Modernization program, which is discussed further below.

Letter of Map Revision (LOMR) and Map Amendment (LOMA)

LOMRs and LOMAs represent separate floodplain studies dealing with individual properties or limited stream segments that update the FIS and FIRM data between periodic FEMA publications of the FIS and FIRM.

Digital Flood Insurance Rate Maps (DFIRM)

As part of its Map Modernization program, FEMA is converting paper FIRMS to digital FIRMS, DFIRMS. These digital maps:

- Incorporate the latest updates (LOMRs and LOMAs);
- Utilize community supplied data;
- Verify the currency of the floodplains and refit them to community supplied basemaps;

-
- Upgrade the FIRMs to a GIS database format to set the stage for future updates and to enable support for GIS analyses and other digital applications; and
 - Solicit community participation.

Past Occurrences

Historically, portions of Placer County have always been at risk to flooding because of its high annual percentage of rainfall, heavy snowfall in the winter, and the number of watercourses that traverse the County. Between 1950 and 2008, Placer County experienced ten state or federally declared flood disasters. Flooding events have caused severe damage in the very eastern and very western portions of the County, but are less of a threat within the center of the County. However, western Placer County is more likely to experience severe flooding than in other areas. With the exception of Colfax, portions of all other incorporated cities in western Placer are at least partially located within the 100-year floodplain. Existing watershed reports confirm that under existing conditions, flooding will continue to occur.

The HMPC provided information on the following historical flood events in the County.

- **1852** – This was the first big flood to be noted in western Placer. Mining camps were just beginning to spring up in the Lincoln area, so hardly any structures were built which could be affected.
- **1860** – Rains began during the first week of October and culminated in a big storm March 23-28. Major damage was reported from farms and mines along Coon Creek, Auburn Ravine, and Bear River. Main roads remained impassable for weeks.
- **1861-62** – Lincoln had just been founded as a railroad and stagecoach center. The Lincoln-Folsom railroad was closed. The Auburn Ravine Turnpike was severely damaged and closed. Mining debris caused Bear River to change its channel to the south of its original course.
- **1875** – Floods occurred along Bear River and destroyed the bridge to Grass Valley from Sheridan.
- **1880** – Levees were finally being constructed along Bear River.
- **1955** – Listed on NOAA's website as one of the "top 15 weather/water/climate events," significant and extended heavy rain and wind resulted in flooding throughout coastal and inland regions of northern California. Extensive flooding from overflowing small streams occurred in Placer County suburbs. Calculated damages for all areas affected within the State were 28 fatalities and \$1.8 billion in losses.
- **March 1983** – The March 1983 flood damaged approximately 25 residences along Linda and Cirby Creeks in Roseville. Portions of Royer Park were under water as well as areas in the Sierra Lakes Mobile Home Park. Dry Creek overflowed the Darling Way and Riverside Avenue bridges, disrupting traffic and flooding six businesses along Riverside Avenue.
- **February 1986** – This flood was classified as an approximate 70-year event. Placer County was designated a Federal Disaster Area. The flooding caused widespread damage in most of the Dry Creek watershed. Flooding was significant in the Roseville, Rocklin and Loomis areas. Nearly all bridges and culverts were overtopped, with 30 sustaining embankment

damage; the crossing at Rocky Ridge Drive was washed out. Two bridges over Dry Creek were damaged and street cave-ins occurred at a number of locations. Total damages within Placer County were estimated at 7.5 million; damage estimates specific to the Dry Creek Watershed are not available. One person was killed and 62 homes damaged or destroyed within the watershed based upon applications for disaster assistance. Other sources report around 100 homes flooded with water levels up to five feet above floor levels. Dozens of businesses in downtown Roseville were damaged or destroyed. According to information on file with Placer County, as part of the disaster declaration, FEMA reimbursed the County \$376,611; no monies were reimbursed through the State.

- **1992** – Several days of continuous rain followed by a downpour caused Miners Ravine to overflow its banks and caused flooding that resulted in several dramatic rescues of people trapped in homes and vehicles.
- **January 1995** – This flood was classified as an approximate 100-year event. Placer County was designated a Federal Disaster Area. President Clinton toured the Tina/Elisa Way area of Roseville. The total damages within Placer County were estimated at \$8.3 million with 750 damaged or destroyed structures. \$4.2 million in damages were estimated for the Roseville area alone. Of the \$4.2 million dollars in damages, \$1 million was for road and bridge repairs, and \$2 million was for utility repairs. Within the Roseville area of Placer County 385 homes, businesses, apartments, and mobile homes were damaged or destroyed; 2 sewage treatment plants were overtopped; and 1 landfill was damaged. Impassable roads caused the closure of most schools. According to information on file with Placer County, as part of the disaster declaration, FEMA reimbursed the County \$882,158 and \$166,735 was reimbursed through the State.
- As a result of the 1995 floods, a creek crossing (bridge-where Carolinda Drive crosses the Miners Ravine Creek) in the San Juan water district washed out in two separate incidents (January 9th and February or March). The first washout exposed main 10-inch ACP pipeline and made it vulnerable to high water and swift current. The crossing was rebuilt by the Carolinda Homeowner's Association and the line went back into service. The second wash out occurred in February or early March, again due to high water and swift currents. This time the pipe was removed and a new bridge was built with the pipeline now being supported by the new bridge. The cost of repairs and replacement was \$30,400, of which \$27,000 was received through disaster funds.
- **1996** – Heavy rain and clogged storm drains caused water to flow into the Cavitt School Gymnasium (Eureka Union School District) in southern Placer County. A wood floor was lost. The \$85,976 in damages was covered by Emergency Services under a disaster declaration. The drainage system has since been modified.
- **January 1997** – A significant amount of rainfall and snowmelt runoff poured out of the Sierra Nevada from December 30, 1996 to January 1997. This was a very warm system and rain was falling at the 9,000 foot elevation. An estimated 25 inches of rain and snowmelt runoff occurred during this period on the Squaw Creek Basin (the upper Truckee River Basin in Placer County). This scenario was typical throughout the region and resulted in extensive flooding on the Truckee, Carson, Walker, and Susan Rivers. Consequently, record flooding

occurred on much of the Truckee, Carson, and Walker Basins. In Placer County, flooding eroded away mountainsides, breaking sewer, water, and power lines. The south fork of Squaw Creek jumped its bank and burst through the lodge at the Squaw Valley Ski Resort. All bridges across Highway 89 were destroyed or severely damaged. Avalanches closed Highway 89 in both directions isolating Squaw Valley from the outside world. Log jams caused the creek to diverge and deposit 3,500 cubic yards of gravel, boulders, logs, and debris into the stream channel, piling the material up to six feet deep into homes and condominiums (USDA 1997). Mudslides blocked Squaw Valley Road and almost every other road in the area. In Placer County alone, damage estimates for public property were nearly \$11 million. 137 homes and 22 businesses were damaged within the County. Total damage to private homes, businesses, agriculture, and private roads was near \$10 million. Destruction to the Federal Highway System was nearly \$7.7 million. According to information on file with Placer County, as part of the disaster declaration, FEMA reimbursed the County \$717,754 and \$177,451 was reimbursed through the State.

- **January 2008** – flooding of residential structures at two different property locations occurred as a result of an intense storm event on January 1, 2008. Property damages were estimated at \$10,000 for one property; minor damages were cited at the other property.

NEED Other Current

Likelihood of Future Occurrences

100-Year Flood

Occasional—The 100-year flood is the flood that has a one percent chance in any given year of being equaled or exceeded.

<100-Year Flood/Outside the 100-Year Floodplain

Highly Likely—Based on historical data, flooding events less severe than a 100-year flood and those outside of the 100-year floodplain occur frequently during periods of heavy rains.

4.2.13 Human Health Hazards: Epidemic/Pandemic

Hazard/Problem Description

Epidemics occur when an infectious disease spreads beyond a local population, reaching people in a wider geographical area. When that disease reaches global proportions, it's considered a pandemic. Several factors determine whether an outbreak will explode into an epidemic or pandemic: the ease with which a microbe moves from person to person, and the behavior of individuals and societies.

A pandemic flu is a virulent human flu that causes a global outbreak, or pandemic, of serious illness. A flu pandemic occurs when a new influenza virus emerges for which people have little or no immunity, and for which there is no vaccine. This disease spreads easily from person-to-

person, causes serious illness, and can sweep across the country and around the world in a very short time. The U.S. Centers for Disease Control and Prevention have been working closely with other countries and the World Health Organization to strengthen systems to detect outbreaks of influenza that might cause a pandemic and to assist with pandemic planning and preparation.

Recently, health professionals are concerned by the possibility of an avian (or bird) flu pandemic associated with a highly pathogenic avian H5N1 virus. Since 2003, avian influenza has been spreading through Asia. A growing number of human H5N1 cases contracted directly from handling infected poultry have been reported in Asia, Europe, and Africa, and more than half the infected people have died. There has been no sustained human-to-human transmission of the disease, but the concern is that H5N1 will evolve into a virus capable of human-to-human transmission.

An especially severe influenza pandemic could lead to high levels of illness, death, social disruption, and economic loss. Impacts could range from school and business closings to the interruption of basic services such as public transportation, health care, and the delivery of food and essential medicines.

Past Occurrences

There were three acknowledged pandemics in the twentieth century:

- **1918-19 Spanish flu (H1N1)** – This flu is estimated to have sickened 20-40 percent of the world's population. Over 20 million people lost their lives. Between September 1918 and April 1919, 500,000 Americans died. The flu spread rapidly; many died within a few days of infection, others from secondary complications. The attack rate and mortality was highest among adults 20-50 years old; the reasons for this are uncertain. By late September 1918, over 35,000 people throughout California had contracted influenza. According to State officials, influenza was most prevalent in the southern part of California, but the death toll was high across the state.
- **1957-58 Asian flu (H2N2)** – This virus was quickly identified due to advances in technology, and a vaccine was produced. Infection rates were highest among school children, young adults, and pregnant women. The elderly had the highest rates of death. A second wave developed in 1958. In total, there were about 70,000 deaths in the United States. Worldwide deaths were estimated between 1 and 2 million.
- **1968-69 Hong Kong flu (H3N2)** – This strain caused approximately 34,000 deaths in the United States and more than 700,000 deaths worldwide. It was first detected in Hong Kong in early 1968 and spread to the United States later that year. Those over age 65 were most likely to die. This virus returned in 1970 and 1972 and still circulates today.

Likelihood of Future Occurrences

Occasional—According to historical data, three influenza pandemics have occurred since 1918. This averages out to a pandemic every 30 years or a 3.33 percent chance of pandemic in any

given year. Although scientists cannot predict when the next influenza or other type of pandemic will occur or how severe it will be, wherever and whenever it starts, everyone around the world will be at risk. If an influenza pandemic does occur, it is likely that many age groups would be seriously affected. The greatest risks of hospitalization and death—as seen during the last two pandemics in 1957 and 1968, as well as during annual outbreaks of influenza—will be to infants, the elderly, and those with underlying health conditions. However, in the 1918 pandemic, most deaths occurred in young adults. Few people, if any, would have immunity to a new virus.

4.2.14 Human Health Hazards: West Nile Virus

Hazard/Problem Description

The impact to human health that wildlife, and more notably, insects, can have on an area can be substantial. Mosquitoes transmit the potentially deadly West Nile virus to livestock and humans alike. West Nile virus first struck the western hemisphere in Queens, New York, in 1999 and killed four people. Since then, the disease has spread across the United States. In 2003, West Nile virus activity occurred in 46 states and caused illness in over 9,800 people.

Most humans infected by the virus have no symptoms. A small proportion develops mild symptoms that include fever, headache, body aches, skin rash, and swollen lymph glands. Less than 1 percent of those infected develop more severe illness such as meningitis or encephalitis, symptoms of which include headache, high fever, neck stiffness, stupor, disorientation, coma, tremors, convulsions, muscle weakness, and paralysis. Of the few people who develop encephalitis, fewer than 1 out of 1,000 infections die as a result.

There is no specific treatment or vaccine to prevent the infection. Treatment of severe illness includes hospitalization, use of intravenous fluids and nutrition, respiratory support, prevention of secondary infections, and good nursing care. Medical care should be sought as soon as possible for persons who have symptoms suggesting severe illness. People over 50 years of age appear to be at high risk for the severe aspects of the disease.

Within the Placer County planning area, a mosquito abatement district operates to prevent the spread of the virus through focused efforts on reducing the mosquito population and educating the public. Several types of preventative methods lower mosquito populations to levels that reduce chances for the spread of disease. The County also has an active surveillance program and maintains records for all identified cases of the virus.

Past Occurrences

The virus first appeared in California in 2002 with the identification of one human case. In 2003, three human cases occurred in California and the virus was detected in six southern California counties. By 2004, the virus was in all 58 counties in California; 830 human infections were identified. According to the California West Nile Virus Surveillance Information Center

sponsored by the California Department of Health Services, 28 California residents died from the virus in 2004. Most of these deaths were in Southern California.

By July of 2004, WNV had arrived in Placer County. A dead western scrub jay bird discovered July 22 in Auburn tested positive for the disease. As of November 8, 2004, the California West Nile Virus Surveillance Information Center reported the virus being detected in one human, 47 birds, 26 horses, and three mosquito pools within Placer County. The first human case of WNV in Placer County was diagnosed the week of September 27, 2004. The 56-year old male patient was recovering from meningitis in a local hospital.

In 2005, 54 of the 58 California counties reported some West Nile virus activity and 935 human cases were reported, which included 19 deaths from 12 counties. Clearly, with 35 reported human cases, 2005 was the worst year for WNV in Placer County.

In 2006, the number of human cases in California was 278, with 7 human cases occurring in Placer County; this was significantly down from 2005. In 2007, there were 380 human cases in California, with only 4 reported for Placer. As of June 28, 2008, there have been no reported incidents of WNV in the County. Table 4.13 summarizes reported West Nile Virus cases in Placer County for the years 2004 through 2007.

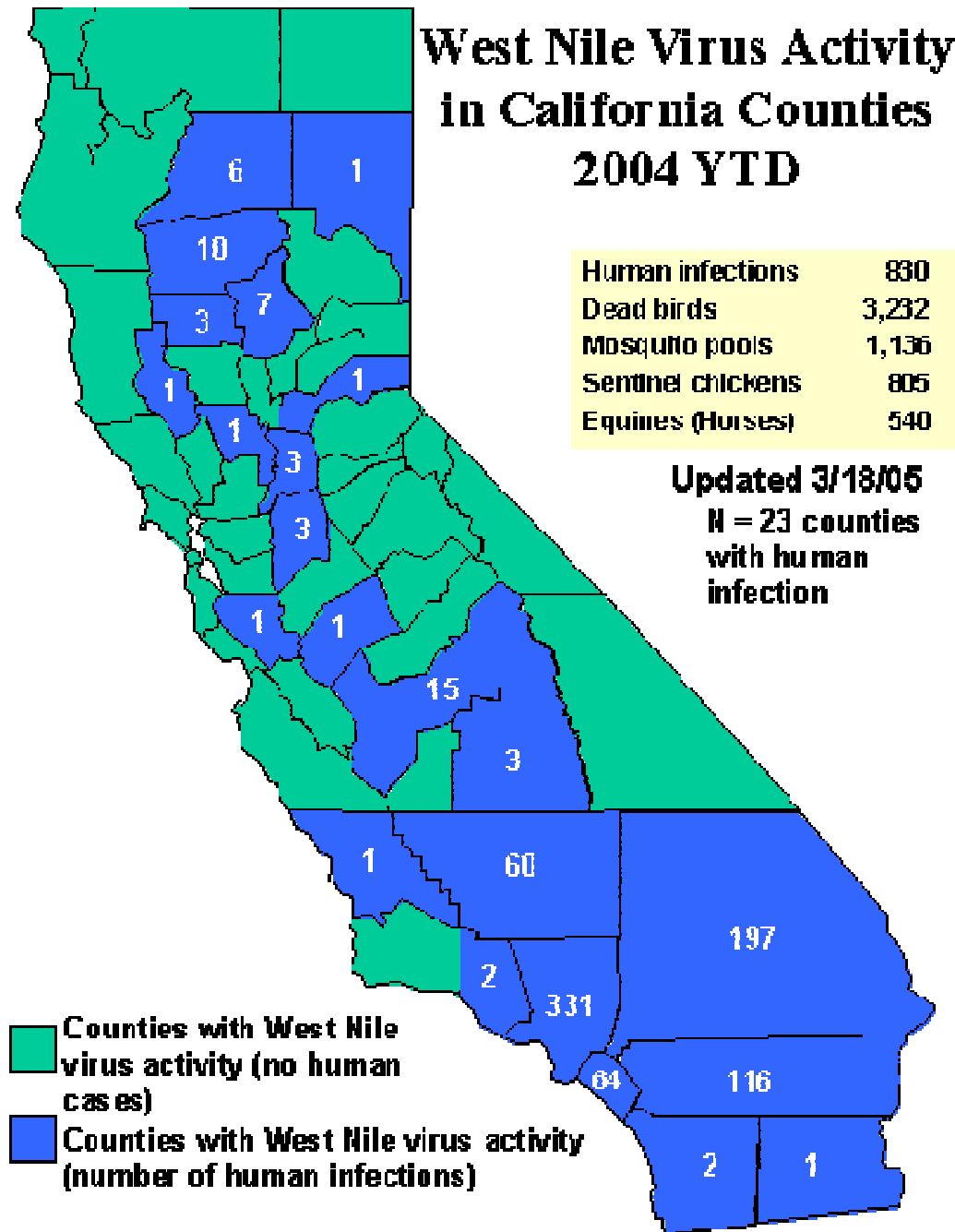
Table 4.13. Summary of West Nile Virus in California and Placer County, 2004-2007

Year	Humans		Birds		Mosquitoes		Horses		Sentinel Flock	
	CA	Placer County	CA	Placer County	CA	Placer County	CA	Placer County	CA	Placer County
2004	830	1	3,232	47	1,136	4	540	26	805	25
2005	935	35	3,046	84	1,242	20	456	23	1,053	2
2006	278	7	1,446	10	832	22	58	0	640	5
2007	380	4	1,395	16	1,007	25	28	1	510	13

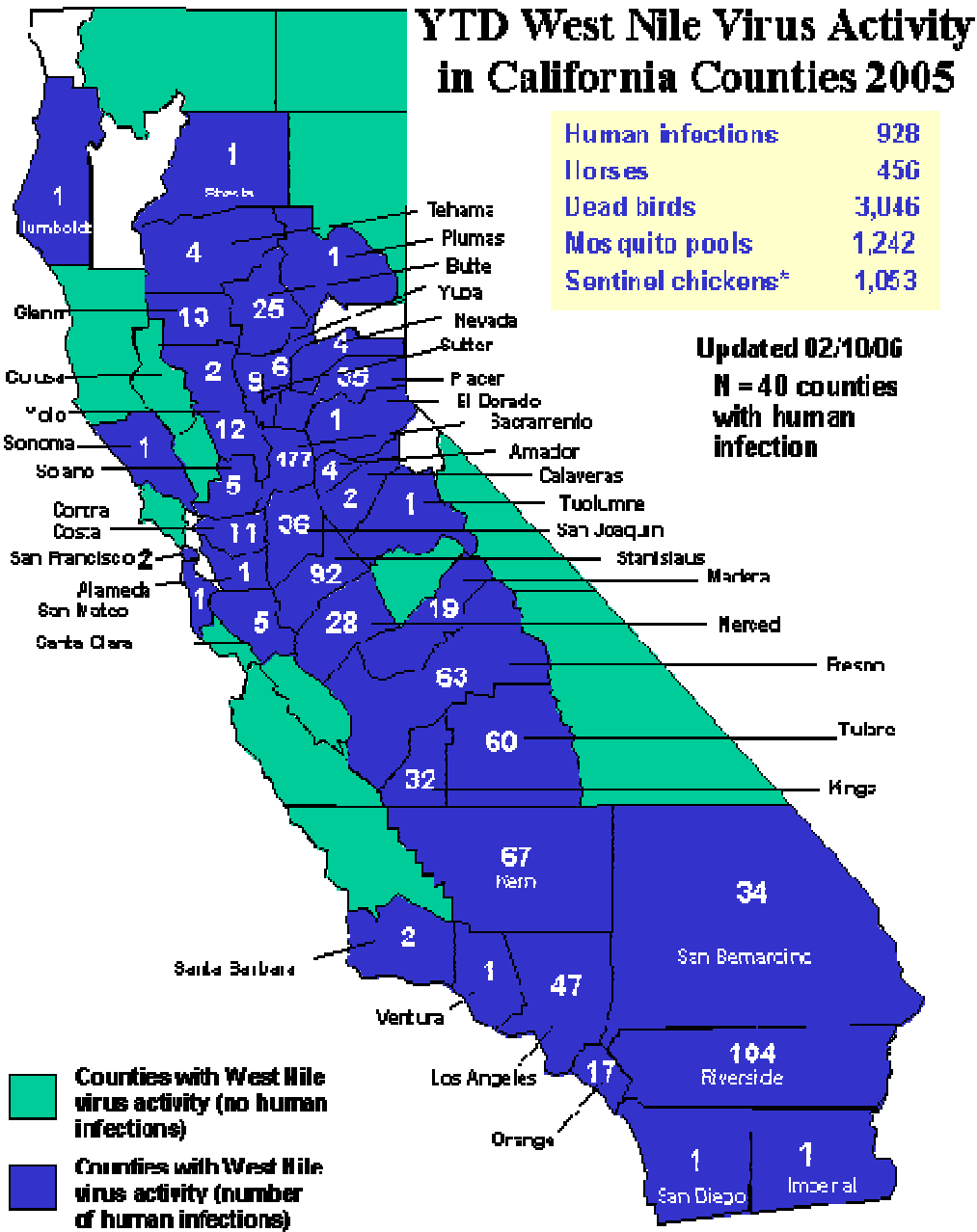
Source: California Department of Public Health, www.westnile.ca.gov/

West Nile virus activity in California (and Placer County) for 2004, 2005, 2006, and 2007 is illustrated in Figures 4.19-4.22.

Figure 4.19. West Nile Virus Activity in California Counties, 2004

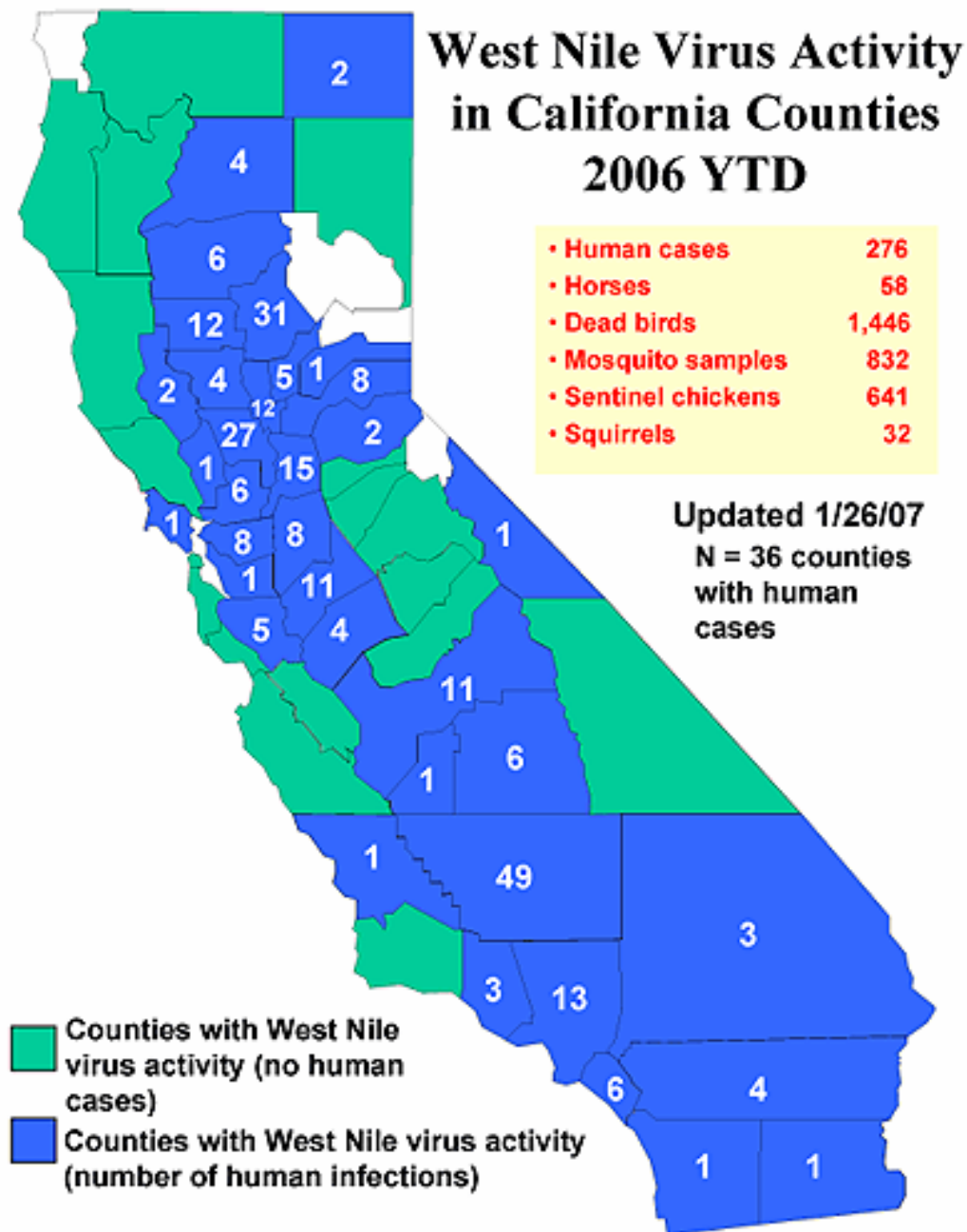


Source: California Department of Public Health, www.westnile.ca.gov/



Source: California Department of Public Health, www.westnile.ca.gov/

Figure 4.21. West Nile Virus Activity in California Counties, 2006



Source: California Department of Public Health, www.westnile.ca.gov/



Source: California Department of Public Health, www.westnile.ca.gov/

In response to the increased activity of the virus in California, in August of 2007, Governor Schwarzenegger signed an emergency proclamation committing more than \$10 million in emergency funding to fight the virus.

Likelihood of Future Occurrences

Highly Likely—Based on historical data, the Placer County planning area has experienced 47 human cases of West Nile virus since its discovery in California in 2003. This is an average of 10.6 cases per year. The agricultural nature of some of the planning area, combined with the potential for standing water to be present throughout the County, puts the planning area at future risk of West Nile virus.

4.2.15 Landslide

Hazard/Problem Description

Landslides refer to a wide variety of processes that result in the perceptible downward and outward movement of soil, rock, and vegetation under gravitational influence. Common names for landslide types include slump, rockslide, debris slide, lateral spreading, debris avalanche, earth flow, and soil creep. Landslides may be triggered by both natural and human-induced changes in the environment that result in slope instability.

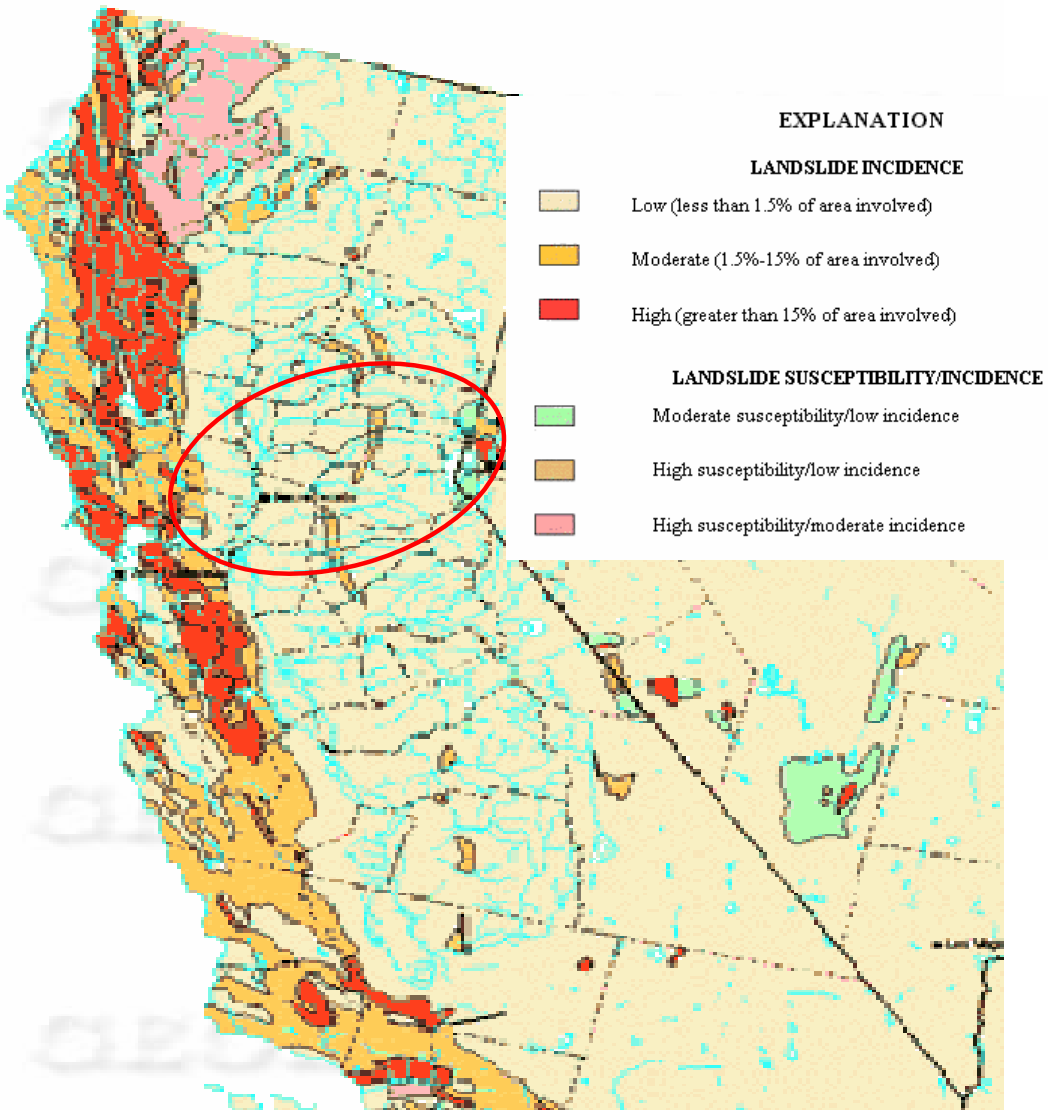
The susceptibility of an area to landslides depends on many variables including steepness of slope, type of slope material, structure and physical properties of materials, water content, amount of vegetation, and proximity to areas undergoing rapid erosion or changes caused by human activities. These activities include mining, construction, and changes to surface drainage areas.

Landslides often accompany other natural hazard events, such as floods, wildfires, or earthquakes. Landslides can occur slowly or very suddenly and can damage and destroy structures, roads, utilities, and forested areas, and can cause injuries and death.

The Placer County General Plan Background Report describes areas in Placer County that are particularly prone to landslides. Slope instability and landslide hazards are generally found in areas of eastern Placer County, as seen in active and inactive landslide deposits. Two specific Rock Units identified in the Background Report which show evidence of past landslide activity (and are still considered active landslide areas) include the Valley Springs Tuff, located at Alta and Interstate 80, and Metavolcanic Flows, located in the canyons of the North Fork of the American River. The inactive landslide deposit areas in Placer County include the metavolcanic flow rock units along the canyon slopes of the North and Middle Forks of the American River, and along the Truckee River. Although these landslide areas are no longer active, they could be reactivated by either natural erosion or human activities. Other potential landslide areas identified by the HMPC include Interstate 80 east of Colfax and State Route 49 south of Auburn.

Figure 4.23 was developed for the State of California Multi-Hazard Mitigation Plan. It indicates that most areas throughout Placer County are at low to moderate risk for landslides and an area in the eastern portion of the County is at high risk for landslides.

Figure 4.23. Landslide Risk Zones



Source: State of California Multi-Hazard Mitigation Plan, www.hazardmitigation.oes.ca.gov/

Past Occurrences

There have been no disaster declarations associated with landslides in Placer County. Notable landslides of record include the following landslides in the Tahoe area along the Truckee River, Squaw Creek, and Bear Creek rivers associated with the 1997 Flood event:

- **Wayne Road Landslide** – The Wayne Road Landslide was the most significant of the three landslides. The Wayne Road Landslide is actually the result of two separate failures occurring in separate drainages. The drainages meet just upslope of the impacted area directly west of the intersection of Sandy Way and Wayne Road. Based on information provided by local residents and Placer County personnel, the homes in the area were also impacted by landsliding in 1982 and in 1986. The 1982 event was larger than the 1986 event. Placer County personnel stated that, following the 1986 landslide, several small sedimentation basins were constructed north of Sandy Way in an attempt to contain future slide debris. These sedimentation basins were obliterated by slide debris during the 1997 event. Slide debris consisted of saturated, loose, silty sand and sandy silt with rock ranging in size from gravel to boulders up to 4 feet in diameter. The debris plugged existing culverts and several feet of slide debris were deposited against the sides of several residences.
- **Sandy Way Landslide** – The Sandy Way Landslide occurred approximately one-quarter mile west of the Wayne Road Landslide, originating just west of Squaw Summit Road, and deposited significant debris upslope of several residences on Sandy Way.
- **Navajo Court Landslide** – The Navajo Court Landslide originated just east of a 300,000-gallon water storage tank located above the intersection of Navajo Court and Squaw Summit Road. The landslide debris flowed downslope, inundating the intersection of Navajo Court and Squaw Summit Road and plugged two culverts beneath Squaw Summit Road. The channel was rerouted to the west and flowed down both sides of Navajo Court, eroding new gullies on both sides of the road. Debris continued downslope, plugged two culverts beneath Christy Lane and deposited a significant amount of debris in the parking lot behind the post office on Squaw Valley Road.

Figure 4.24 depicts the landslide areas described above.



Also identified by the HMPC, recent landslide areas of concern include the following:

Landslide Areas

- Old Foresthill Road
- Ophir Road (two sites) – (1) near Stonehouse Road and (2) near Wise Road
- Yankee Jims Road

Likelihood of Future Occurrences

Occasional—Based on data provided by the HMPC, minor landslides have occurred in the past, probably over the last several hundred years, as evidenced both by past deposits exposed in erosion gullies and recent landslide events. With significant rainfall, additional failures are likely to occur within the identified landslide hazard areas. Given the nature of localized problems identified within the County, minor landslides will likely continue to impact the area when heavy precipitation occurs, as they have in the past.

4.2.16 Soil Hazards: Erosion

Hazard/Problem Description

Erosion is the general process whereby rocks and soils are broken down, removed by weathering, or fragmented and then deposited in other places by water or air. The rate of erosion depends on many variables, including the soil or rock texture and composition, soil permeability, slope, extent of vegetative cover, and precipitation amounts and patterns. Erosion increases with increasing slope and precipitation and with decreasing vegetative cover, which includes areas where protective vegetation has been removed by fire, construction, or cultivation. Significant erosion can cause degradation and loss of agricultural land, sedimentation and degradation of streams and rivers, and slope instability.

The General Plan Background Report identifies those areas with moderately high to high erosion potential. Most soils in central and eastern Placer County are subject to high erosion potential while other areas have soils with moderate to very high erosion potential.

Past Occurrences

Areas with recent erosion problems identified by the HMPC include....

Likelihood of Future Occurrences

Likely—Based on input from the HMPC, erosion does occur in the planning area. Given the types of soils and past erosion problems identified within the County, erosion will continue to be an issue.

4.2.17 Soil Hazards: Expansive Soils

Hazard/Problem Description

Expansive (swelling) soils or soft bedrock are those that increase in volume as they get wet and shrink as they dry. They are known as shrink-swell, bentonite, expansive, or montmorillinitic soils. Swelling soils contain high percentages of certain kinds of clay particles that are capable of absorbing large quantities of water, expanding up to 10 percent or more as the clay becomes wet. The force of expansion is capable of exerting pressures of 20,000 per square foot or greater on foundations, slabs, and other confining structures. Soils composed only of sand and gravel have no potential for volume changes. Soils are generally classified into three expansive soil classes with low, moderate, and high potential for volume changes:

- **Low** – This soil class includes sands and silts with relatively low amounts of clay minerals. Sandy clays may also have low expansion potential if the clay is kaolinite. Kaolinite is a common clay mineral.
- **Moderate** – This class includes silty clay and clay textured soils if the clay is kaolinite and also includes heavy silts, light sandy clays, and silty clays with mixed clay minerals.
- **High** – This class includes clays and clay with mixed montmorillonite, a clay mineral which expands and contracts more than kaolinite.

Damage can include severe structural damage, cracked driveways and sidewalks, heaving of roads and highway structures, and disruption of pipelines and other utilities. Destructive forces may be upward, horizontal, or both. Building in and on swelling soils can be done successfully, although more expensively, as long as appropriate construction design and mitigation measures are followed.

According to the Placer County General Plan Background Report, expansive soils within Placer County generally are limited to the low-lying areas, which are concentrated in western Placer County, from the City of Rocklin to the County line.

Past Occurrences

Expansive soils are present in the County. However, due to the ability to successfully mitigate the hazard by adhering to sound design and construction practices, the HMPC was unable to find examples of historical expansive soil problems in the planning area. TRUE?

Likelihood of Future Occurrences

Occasional—Based on the soil types found in Placer County, the potential exists for expansive soils to be a future issue in the Placer County planning area.

4.2.18 Seiches

Hazard/Problem Description

U.S. Army Corps of Engineers defines Seiche as:

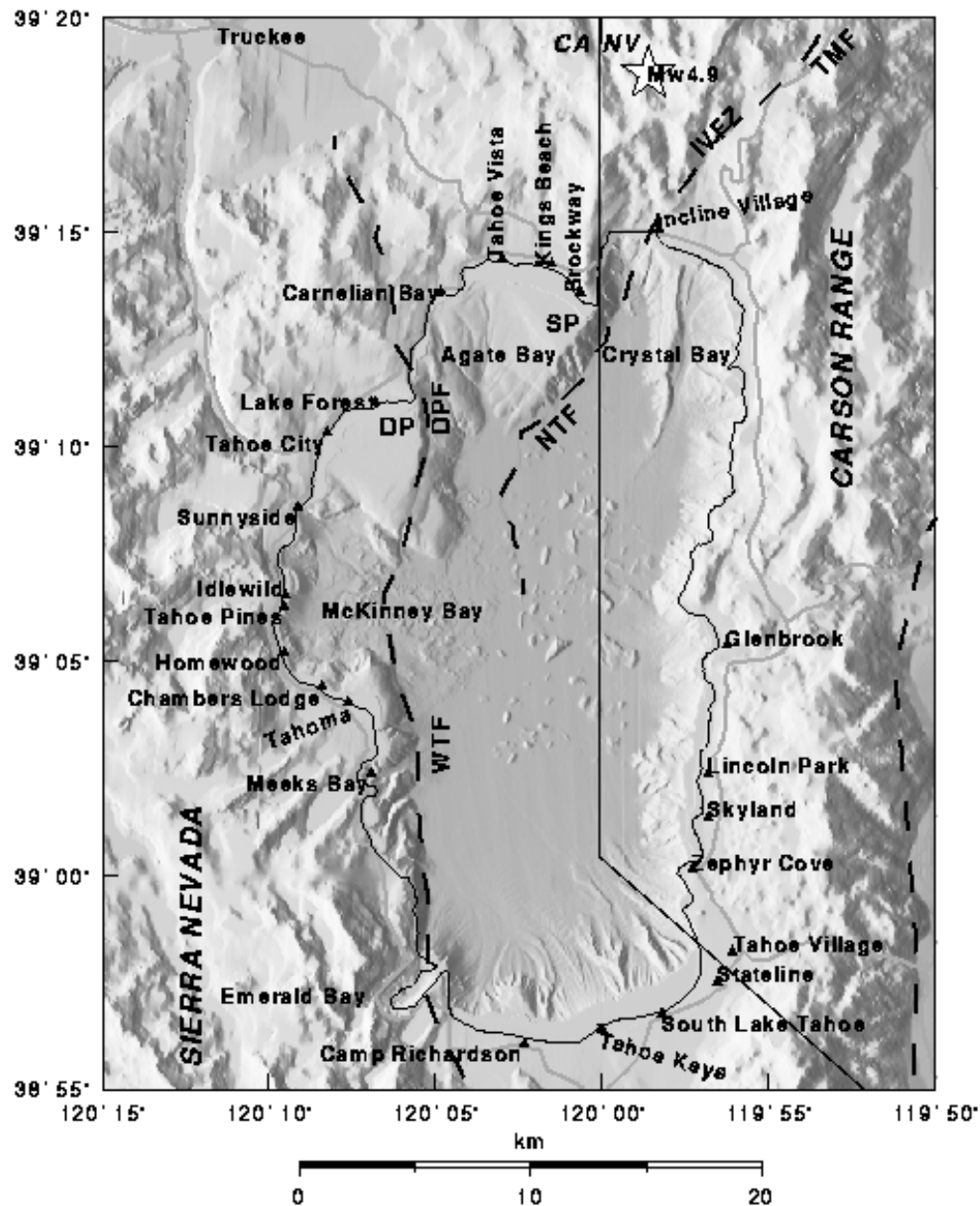
- A standing wave oscillation of an enclosed water body that continues, pendulum fashion, after the cessation of the originating force, which may have been either seismic or atmospheric.
- An oscillation of a fluid body in response to a disturbing force having the same frequency as the natural frequency of the fluid system. Tides are now considered to be seiches induced primarily by the periodic forces caused by the sun and moon.
- In the Great Lakes area, any sudden rise in the water of a harbor or a lake whether or not it is oscillatory (although inaccurate in a strict sense, this usage is well established in the Great Lakes area).

Seiches can be generated when the water is subject to changes in wind or atmospheric pressure gradients or, in the case of semi-enclosed basins, by the oscillation of adjacent connected water bodies having a periodicity close to that of the seiche or of one of its harmonics. Other, less frequent causes of seiches include heavy precipitation over a portion of the lake, flood discharge from rivers, seismic disturbances, submarine mudslides or slumps, and tides. The most dramatic seiches have been observed after earthquakes.

Another way seiches start is when land tilts or drops as a result of fault rupture or other seismic activity. Computer modeling by a group at the University of Nevada at Reno working with a Japanese tsunami expert showed ruptures along either fault could lift or drop the bottom the lake and possibly generate a tsunami. The tsunami in turn could trigger seiche waves within seconds that could crisscross the lake, reach heights of 30 feet or more, and persist for hours.

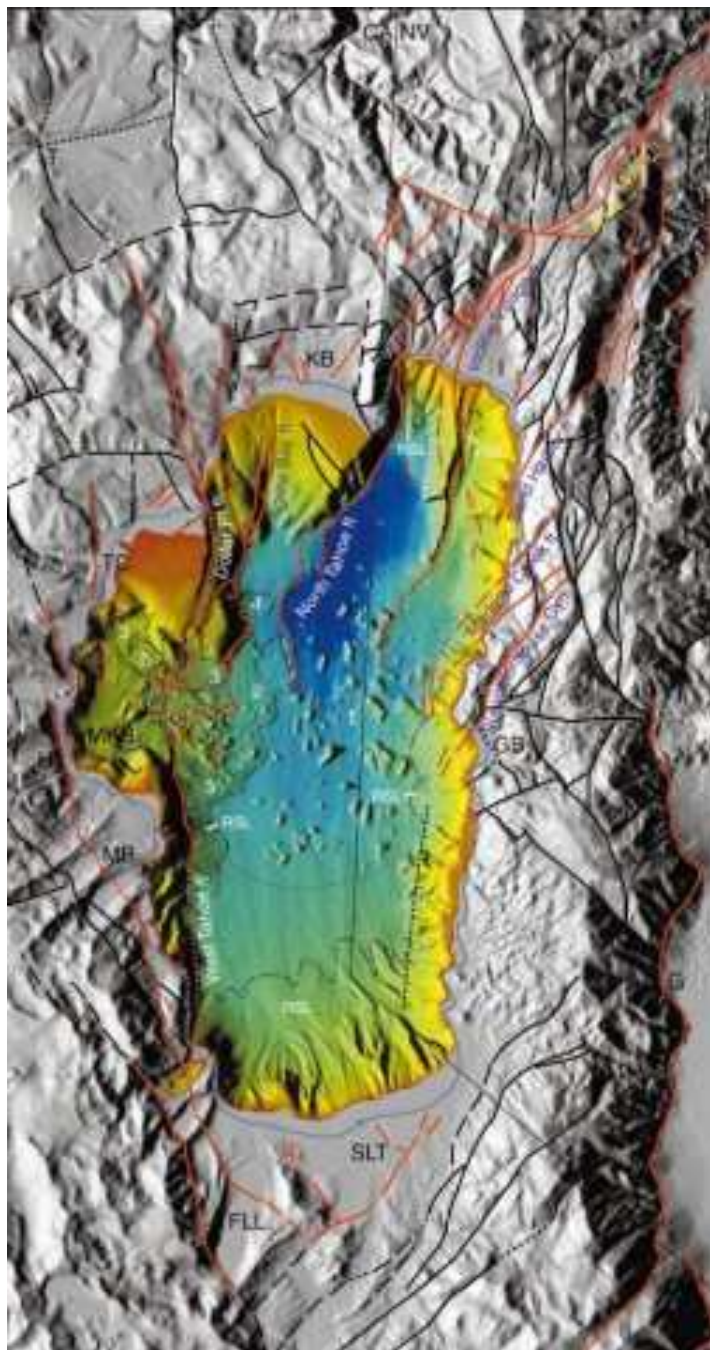
Locations with the highest probability of impact are shore areas of Lake Tahoe from 0 to 30 feet above mean lake water level. Japanese scientist Kenji Satake has done computer models that suggest the largest waves of a seiche event could hit Sugar Pine Point, Rubicon Point, and the casinos in South Lake Tahoe. Figures 4.25 and 4.26 on the following pages show city locations Lake Tahoe basin topography; and lake bathymetry and fault locations, respectively.

Figure 4.25. Lake Tahoe Basin Topography



Source: The Potential Hazard from Tsunami and Seiche Waves Generated by Future Large Earthquakes within the Lake Tahoe Basin, California-Nevada, 1999-2000; Gene A. Ichinose, Kenji Satake, John G. Anderson, Rich A. Schweickert, and Mary M. Lahren; Nevada Seismological Laboratory; University of Nevada; (University of Nevada 2000 study)

Figure 4.26 Lake Tahoe Bathymetry and Fault Locations



Source: University of Nevada Seismic Laboratory, (Schweickert); USGS

Research from the University of Nevada estimates that an earthquake must be at least a magnitude 6.5 to cause a damaging seiche at Lake Tahoe. The two faults directly underneath the lake are considered capable of generating magnitude 7.1 earthquakes. Computer models of seiche activity at Lake Tahoe prepared by the University of Nevada research team estimate that waves as high as 30 feet could strike the shore. These projections suggest largest waves might hit Sugar Pine Point, Rubicon Point, and the casinos in South Lake Tahoe.

In the event of a magnitude 7 earthquake occurring on either of two major faults under the lake, the lake bottom could drop as much as 4 meters. Water supported by the lake floor could drop a corresponding distance and generate waves that heavily impact the shoreline.

Figure 4.27 below shows three potential vertical displacement (uplift or subsidence) scenarios that could be caused by magnitude 7+ earthquakes along the three discrete fault systems in the Lake Tahoe region.

Scenario A represents an earthquake event along the North Tahoe-Incline Village Fault Zone (NT-IVFZ). This scenario projects significant subsidence (0.5-4.0 meters) to the east of the fault in the vicinity of Incline Village and across Crystal Bay and moderate uplift (0.25-1.0 meter) to the west and away from the lake. Shoreline areas near the fault rupture would be inundated due to permanent ground subsidence. Other shoreline areas would be temporarily inundated by tsunami and seiche waves. Seiche wave heights could exceed 3 meters within shallow bays and shores between Incline Village and Carnelian Bay, and exceed 6 meters at some locations in the South Lake area.

Scenario B represents an earthquake event along the West Tahoe-Dollar Point Fault Zone (WTFZ). This scenario projects significant subsidence (0.5-4.0 meters) across the lake bottom to the east of the fault and moderate uplift (0.25-1.0 meter) to the west across McKinney Bay and away from the lake. Scenario B projects a similar pattern of seiche wave heights as Scenario A except that wave heights in some areas could be as high as 10 meters.

Scenario C represents an earthquake event along the Genoa Fault Zone (GFZ) 7-10 miles east of the lake shore. This scenario projects minor to moderate uplift (0.25-0.75 meter) to the southwest of the lake. Scenario C produces waves with average heights of 0.5 meters, indicating that magnitude 7 earthquakes along faults outside of the lake are not likely to create a large seiche event.

Figure 4.27 Contours of Vertical Component Ground and Lake Bottom Displacements

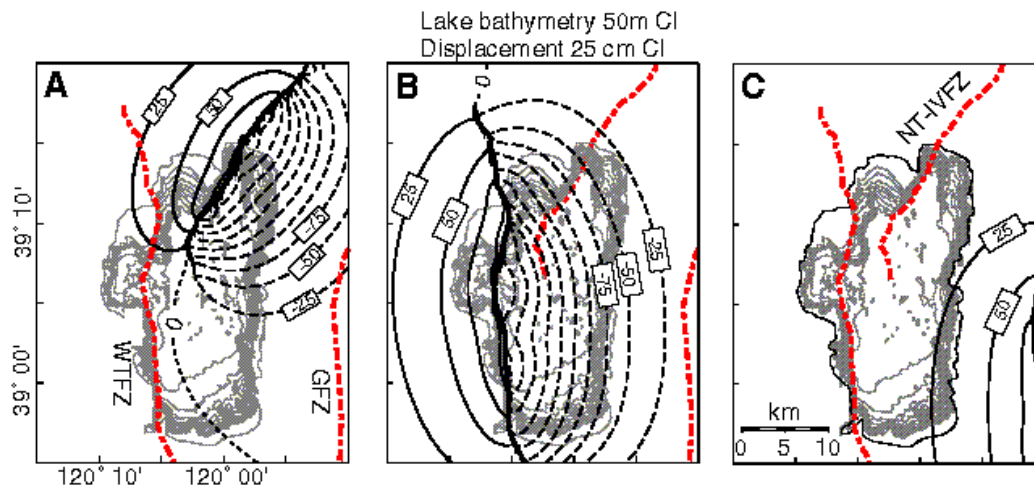


Figure 2. Contours of vertical component ground and lake bottom displacements for scenarios "A", "B" and "C". The dashed contours represent subsidence and solid uplift. The contour interval is 25 cm and only the first few contours are labeled. The thick dash-dotted lines are the three fault traces used in the scenarios: North Tahoe-Incline Village fault zone (NT-IVFZ), West Tahoe-Dollar Point fault zone (WTF) and Genoa fault zone (GFZ). All of the scenarios are Mw 7+ normal faulting earthquakes with a maximum slip of 4 meters tapered to zero at the ends of the fault with a trapezoid function.

Source: The Potential Hazard from Tsunami and Seiche Waves Generated by Future Large Earthquakes within the Lake Tahoe Basin, California-Nevada, 1999-2000; Gene A. Ichinose, Kenji Satake, John G. Anderson, Rich A. Schweickert, and Mary M. Lahren; Nevada Seismological Laboratory; University of Nevada; (University of Nevada 2000 study)

Past Occurrences

There have been no occurrences of major seiche activity at Lake Tahoe in recent years. University of Nevada geologists have found deposits that extend for 10 miles along the McKinney Bay shore from Sunnyside through Tahoma. These deposits indicate a tsunami or seiche with 30-foot-high waves occurred approximately 7,000 years ago.

Research performed by the Scripps Institute of Oceanography using acoustic trenching to research the lake's topography indicates that McKinney Bay was formed when a massive landslide slipped into Lake Tahoe which likely caused major seiche activity at that time. Research from the University of Nevada shows evidence of a massive landslide that tumbled from Homewood on the Nevada side.

Recent occurrences of potential causal factors include a magnitude 4.9 earthquake near Incline Village in 1998.

Likelihood of Future Occurrences

Unlikely— There have been no occurrences of major seiche activity at Lake Tahoe in recent years. Based on past occurrences, the likelihood of future occurrence is unlikely. |

4.2.19 Volcano

The State of California Multi-Hazard Mitigation Plan identifies volcanoes as one of the hazards that can adversely impact the State. However, there have been few losses in California from volcanic eruptions. Of the approximately 20 volcanoes in the State, only a few are active and pose a threat. Of these, Long Valley Caldera and Lassen Peak are the closest to Placer County. The Long Valley area is considered to be an active volcanic region of California and includes features such as the Mono-Inyo Craters, Long Valley Caldera, and numerous active and potential faults. Figure 4.28 shows volcanoes in or near California and the location of the Lassen Peak and the Long Valley area relative to the Placer County planning area.

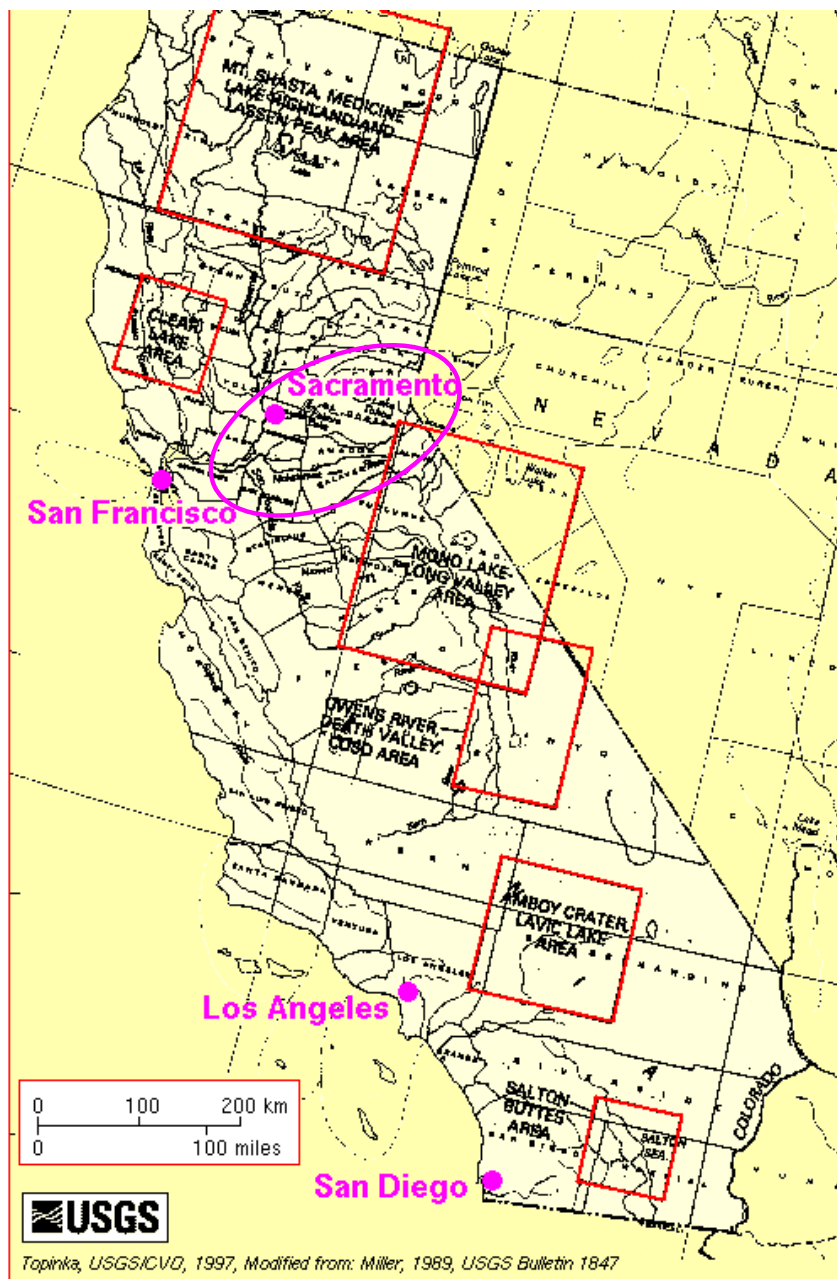
Figure 4.28. Volcanoes In or Near California



Source: U.S. Geological Survey

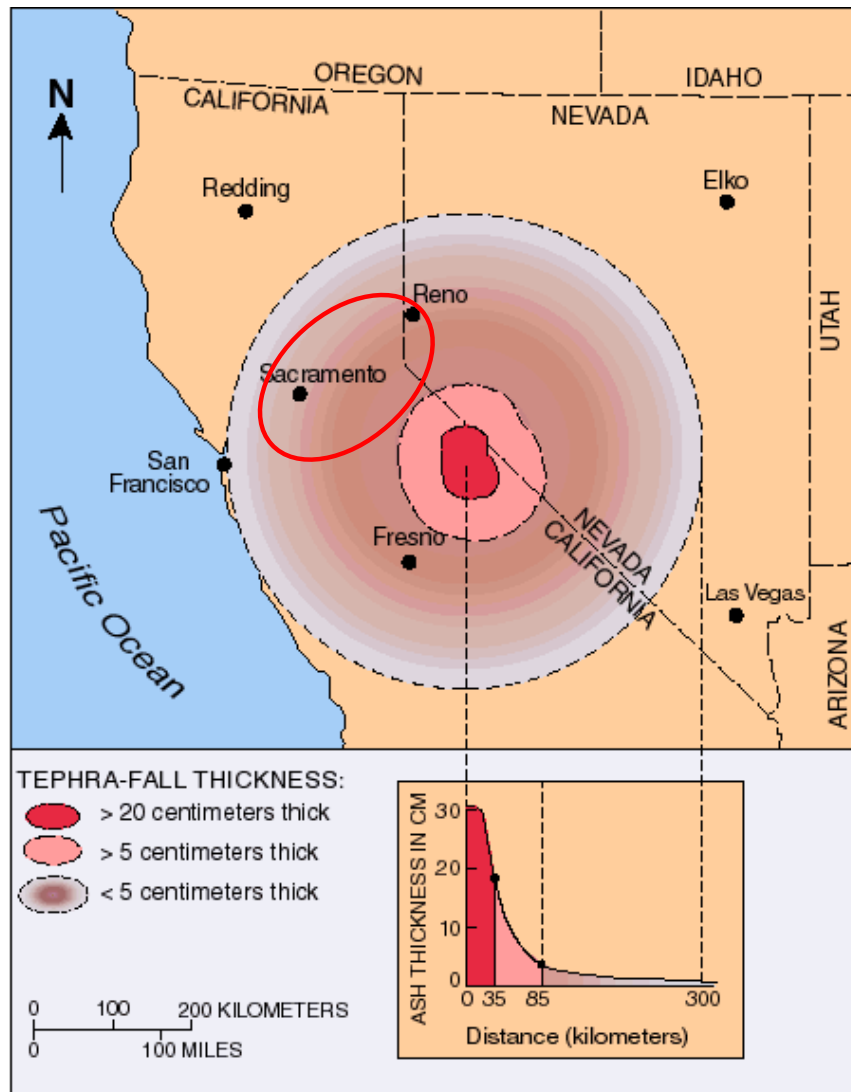
Populations living near volcanoes are most vulnerable to volcanic eruptions and lava flows, although volcanic ash can travel and affect populations many miles away and cause problems for aviation. Figure 4.29 shows areas subject to potential volcanic hazards from future eruptions in California and Figure 4.30 is a volcanic hazard's ash dispersion map for the Long Valley Caldera.

Figure 4.29. Areas Subject to Potential Volcanic Hazards from Future Eruptions in California



Source: U.S. Geological Survey, Cascades Volcano Observatory, <http://vulcan.wr.usgs.gov/Volcanoes/California/>

Figure 4.30. Volcanic Hazards Ash Dispersion Map for the Long Valley Caldera



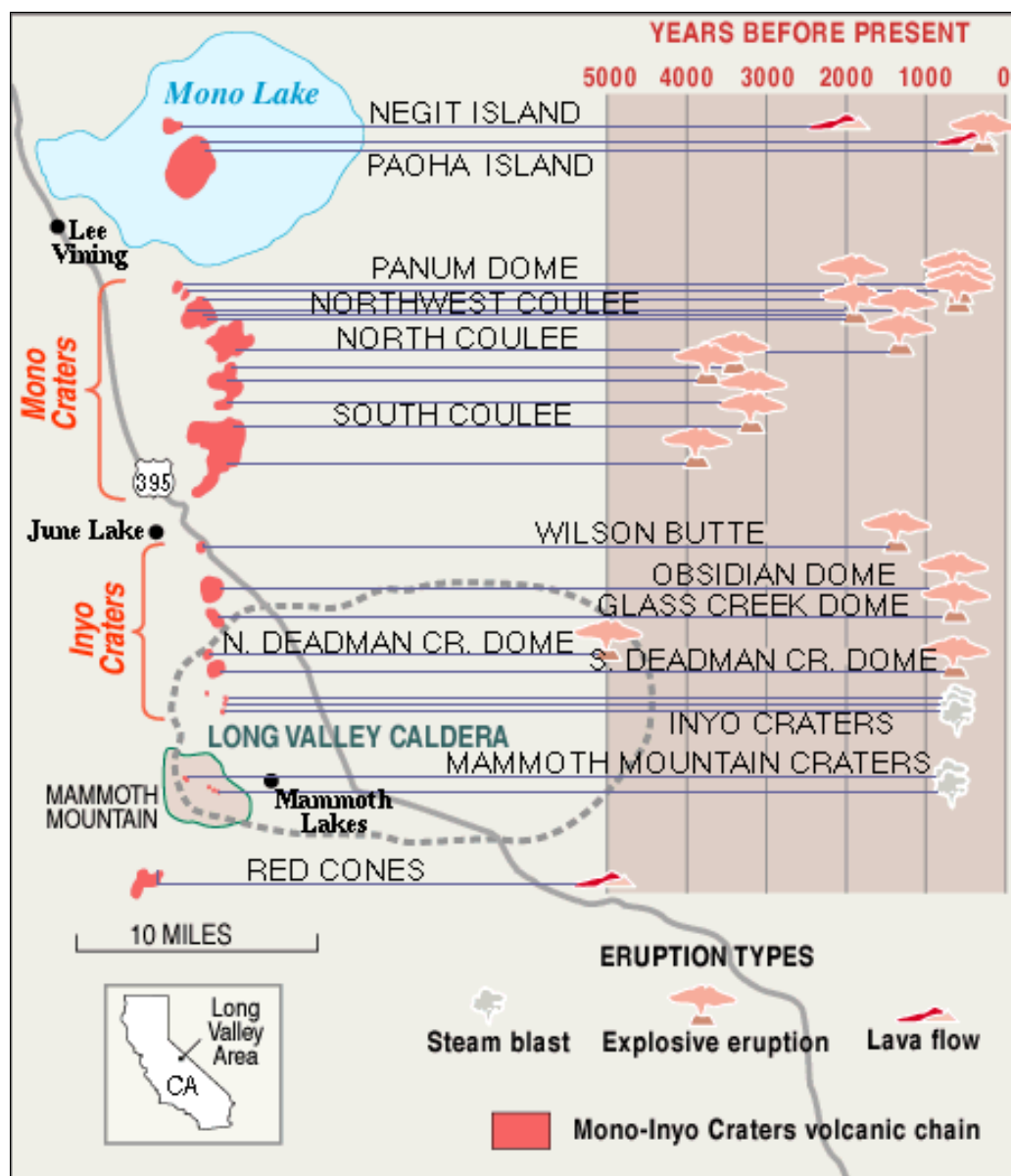
Source US Geological Survey

Past Occurrences

During the past 1,000 years there have been at least 12 volcanic eruptions in the Long Valley area. Mount Shasta has erupted, on average, at least once per 800 years during the last 10,000 years, and about once per 600 years during the last 4,500 years. Volcanoes in the Mono-Inyo Craters volcanic chain have erupted often over the past 40,000 years. Over the past 5,000 years,

small to moderate eruptions have occurred at various sites along the Mono-Inyo Craters volcanic chain at intervals ranging from 250 to 700 years (see Figure 4.31).

Figure 4.31. Volcanic Activity in the Mono-Inyo Craters Volcanic Chain of the Past 5,000 Years



Source: U.S. Geological Survey, <http://pubs.usgs.gov/fs/fs073-97/eruptions.html>

As recently as 1980 four large earthquakes (greater than magnitude 6 on the Richter Scale) and numerous relatively shallow earthquakes occurred in the area. Since then, earthquakes and associated uplift and deformation in the Mammoth Lakes Caldera have continued. Because such activities are common precursors of volcanic eruptions, the U.S. Geological Survey closely monitors the unrest in the region.

Likelihood of Future Occurrences

Unlikely—According to the U.S. Geological Survey, the pattern of volcanic activity over the past 5,000 years suggests that the next eruption in the Long Valley area will most likely happen somewhere along the Mono-Inyo volcanic chain. However, the probability of such an eruption occurring in any given year is less than 1 percent. The next eruption will most likely be small and similar to previous eruptions along the Mono-Inyo volcanic chain during the past 5,000 years (see Figure 4.29 above). According to the State Multi-Hazard Mitigation Plan, only Medicine Lake, Mount Shasta, Lassen Peak, and the Long Valley Caldera are considered active and pose a threat of future activity. However, the State Plan does not consider Placer County to be vulnerable to eruption and/or ash from these volcanoes.

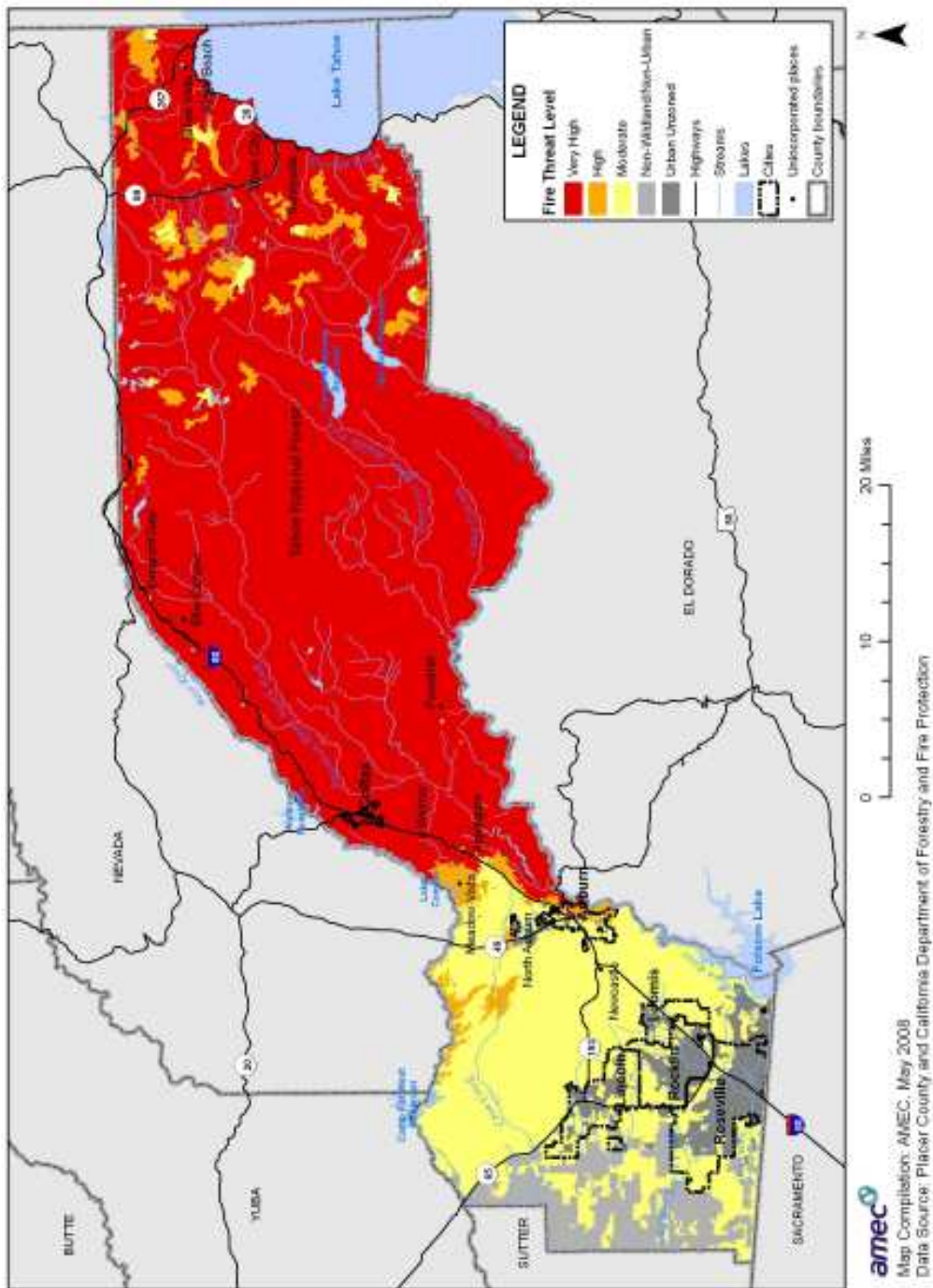
4.2.20 Wildfire

Hazard/Problem Description

Wildland fire is an ongoing concern for the Placer County planning area. Generally, the fire season extends from early spring through late fall of each year during the hotter, dryer months. Fire conditions arise from a combination of high temperatures, low moisture content in the air and fuel, an accumulation of vegetation, and high winds.

Throughout California, communities are increasingly concerned about wildfire safety as increased development in the foothills and mountain areas and subsequent fire control practices have affected the natural cycle of the ecosystem. While wildfire risk is predominantly associated with wildland urban interface (WUI) areas, significant wildfires can also occur in heavily populated areas. The wildland urban interface is a general term that applies to development adjacent to landscapes that support wildland fire. Wildland fires affect grass, forest, and brushlands, as well as any structures located within them. Where there is human access to wildland areas, such as the Sierra Nevada and foothills areas, the risk of fire increases due to a greater chance for human carelessness and historical fire management practices. Within the County, the area starting in the foothills just east of Auburn and extending east and north to the County line is most prone to wildfire due to its terrain and vegetation. Figure 4.32 illustrates Placer County's wildfire threat.

Figure 4.32. Placer County Wildfire Threat



Potential losses from wildfire include human life, structures and other improvements, natural and cultural resources, quality and quantity of water supplies, cropland, timber, and recreational opportunities. Economic losses could also result. Smoke and air pollution from wildfires can be a severe health hazard. In addition, catastrophic wildfire can create favorable conditions for other hazards such as flooding, landslides, and erosion during the rainy season.

Generally, there are three major factors that sustain wildfires and predict a given area's potential to burn. These factors are fuel, topography, and weather.

- **Fuel** – Fuel is the material that feeds a fire and is a key factor in wildfire behavior. Fuel is generally classified by type and by volume. Fuel sources are diverse and include everything from dead tree leaves, twigs, and branches to dead standing trees, live trees, brush, and cured grasses. Also to be considered as a fuel source are manmade structures, such as homes and other associated combustibles. The type of prevalent fuel directly influences the behavior of wildfire. Fuel is the only factor that is under human control. As a result of effective fire suppression since the 1930s, vegetation throughout the county has continued to grow and accumulate, and hazardous fuels have increased. As such, certain areas in and surrounding Placer County are extremely vulnerable to fires as a result of dense vegetation combined with a growing number of structures being built near and within rural lands. These high fuel hazards, coupled with a greater potential for ignitions, increases the susceptibility of the County to a catastrophic wildfire.
- **Topography** – An area's terrain and land slopes affect its susceptibility to wildfire spread. Both fire intensity and rate of spread increase as slope increases due to the tendency of heat from a fire to rise via convection. The arrangement of vegetation throughout a hillside can also contribute to increased fire activity on slopes.
- **Weather** – Weather components such as temperature, relative humidity, wind, and lightning also affect the potential for wildfire. High temperatures and low relative humidity dry out fuels that feed wildfires, creating a situation where fuel will ignite more readily and burn more intensely. Thus, during periods of drought, the threat of wildfire increases. Wind is the most treacherous weather factor. The greater a wind, the faster a fire will spread and the more intense it will be. Winds can be significant at times in Placer County. North winds in Placer County are especially conducive to hot, dry conditions, which can lead to "red flag" days indicating extreme fire danger. In addition to wind speed, wind shifts can occur suddenly due to temperature changes or the interaction of wind with topographical features such as slopes or steep hillsides. Lightning also ignites wildfires, often in difficult to reach terrain for firefighters.

Factors contributing to the wildfire risk in Placer County include

- Overstocked forests, severely overgrown vegetation, and lack of defensible space around structures;
- Excessive vegetation along roadsides and hanging over roads, fire engine access, and evacuation routes;

-
- Drought and overstocked forests with increased beetle kill in weakened and stressed trees;
 - Narrow and often one-lane and/or dead-end roads complicating evacuation and emergency response as well as the many subdivisions that have only one means of ingress/egress;
 - Inadequate or missing street signs on private roads and house address signs;
 - Nature and frequency of lightning ignitions; and
 - Increasing population density leading to more ignitions.

CAL FIRE has mapped fuel hazards in the County based on vegetation, fire history, and slope, with the hazards ranked as medium, high or very high. This data shows that fuel hazards are generally high throughout the Greater Auburn FSC and generally high or very high in the Foresthill/Iowa Hill and Placer Sierra FSC. The highest fuel hazards occur along the Middle and North Forks of the American River: from the American River to Michigan Bluff in the south; from the American River to Sugar Pine and Big Reservoirs east of Iowa Hill; and along I-80 from Gold Run to Nyack in the north.

All of the above factors create the potential for very active to severe fire behavior in the planning area.

Past Occurrences

Wildfires are of significant concern throughout California. According to the California Department of Forestry and Fire Protection (CAL FIRE), vegetation fires occur within their jurisdiction on a regular basis; most are controlled and contained early with limited damage. For those ignitions that are not readily contained and become wildfires, damage can be extensive. There are many causes of wildfire, from naturally caused lightning fires to human-caused fires linked to activities such as smoking, campfires, debris burning, equipment use, and arson. Recent studies conclude that the greater the population density in an area, the greater the chance of an ignition. With population (and ignition densities) continuing to grow throughout California and the Placer County planning area, combined with increased fuel loads, the risk posed by wildfire also continues to grow.

According to the 2008 Community Wildfire Protection Plan (CWPP) for the West Slope of the Sierra Nevada in Placer County, an ignition analysis conducted for Placer County from 1996 to 2005 indicated that the majority of ignitions in the County are caused by people (85.1 percent); 10.4 percent are of unknown origins and 4.5 percent are caused by lightning. The majority of human-caused ignitions (76 percent) are from vehicles, equipment, or arson. The densities occurred in Newcastle, near Bowman, and along the Foresthill Road. High-moderate densities of ignitions occur along developed areas along Interstate 80 (I-80). East of I-80, ignition densities steadily decline as human population densities decrease. Ignition densities generally correspond to development and traffic patterns.

Based on an historical CAL FIRE database, Placer County has experienced over 149 significant wildfires between 1908 and 2007. Details are provided in the Tables 4.14 and 4.15 and Figure 4.33 provided on the following pages.

Table 4.14 Placer County Fires* by Cause and Acres Burned (1908 – 2007)

Cause	Count	Total Acreage
Arson	2	561.3
Campfire	3	16,872.9
Debris	4	1,235.0
Equipment Use	5	2,998.4
Lightning	6	4,776.7
Miscellaneous	17	37,584.4
Power Line	1	284.2
Smoking	5	44,720.4
Structure	1	934.4
Unknown/Unidentified	85	124,175.0
Vehicle	2	3,372.3
Totals	131	237,515.0

*Includes fires greater than 100 acres in size

Source: California Department of Forestry and Fire Protection 2003 Fire Perimeters GIS coverage.

(The AGENCY attribute in the fires subclass is currently populated with the agency who supplied that particular incident.)

Table 4.15 Placer County Fires* by Cause and Acres Burned (1908 – 2007)

Year	Fire Name	Acreage	Cause	Jurisdiction
1908	-	1258.9	Unknown/Unidentified	Unincorporated
1908	-	631.2	Unknown/Unidentified	Unincorporated
1908	-	219.5	Unknown/Unidentified	Unincorporated
1909	-	896.2	Unknown/Unidentified	Unincorporated
1910	-	113.6	Unknown/Unidentified	Unincorporated
1910	-	2253.7	Unknown/Unidentified	Unincorporated
1910	-	239.0	Unknown/Unidentified	Unincorporated
1910	-	387.7	Unknown/Unidentified	Unincorporated
1910	-	485.0	Unknown/Unidentified	Unincorporated
1910	-	185.3	Unknown/Unidentified	Unincorporated
1910	-	1533.3	Unknown/Unidentified	Unincorporated
1910	-	260.0	Unknown/Unidentified	Unincorporated
1910	-	770.4	Unknown/Unidentified	Unincorporated
1911	-	1267.0	Unknown/Unidentified	Unincorporated

Year	Fire Name	Acreage	Cause	Jurisdiction
1913	-	1272.7	Unknown/Unidentified	Unincorporated
1913	-	366.2	Unknown/Unidentified	Unincorporated
1916	-	1407.7	Miscellaneous	Unincorporated
1916	-	293.2	Unknown/Unidentified	Unincorporated
1917	-	6268.8	Unknown/Unidentified	Unincorporated
1917	-	498.4	Unknown/Unidentified	Unincorporated
1917	-	865.0	Unknown/Unidentified	Unincorporated
1917	MILLER DIGGINS FIRE	287.3	Unknown/Unidentified	Unincorporated
1917	SECTION 28	231.8	Miscellaneous	Unincorporated
1917	SECTION 28	1698.1	Miscellaneous	Unincorporated
1918	-	178.9	Miscellaneous	Unincorporated
1918	WILD CAT	386.8	Lightning	Unincorporated
1918	-	1013.2	Unknown/Unidentified	Unincorporated
1919	-	257.6	Unknown/Unidentified	Unincorporated
1919	-	882.7	Unknown/Unidentified	Unincorporated
1919	-	611.0	Unknown/Unidentified	Unincorporated
1919	-	1702.3	Unknown/Unidentified	Unincorporated
1919	-	787.0	Unknown/Unidentified	Unincorporated
1921	PENNSYLVANIA	273.4	Miscellaneous	Unincorporated
1923	-	189.8	Unknown/Unidentified	Unincorporated
1924	-	1102.2	Miscellaneous	Unincorporated
1924	-	105.4	Unknown/Unidentified	Unincorporated
1924	-	114.0	Unknown/Unidentified	Unincorporated
1924	-	1769.9	Unknown/Unidentified	Unincorporated
1924	-	222.4	Unknown/Unidentified	Unincorporated
1924	-	1401.4	Unknown/Unidentified	Unincorporated
1924	-	710.8	Unknown/Unidentified	Unincorporated
1924	-	243.7	Unknown/Unidentified	Unincorporated
1924	-	27879.5	Unknown/Unidentified	Unincorporated
1924	-	114.0	Unknown/Unidentified	Unincorporated
1925	DEADMAN'S FLAT	2587.8	Miscellaneous	Unincorporated
1926	-	2640.8	Unknown/Unidentified	Unincorporated
1926	-	1671.3	Miscellaneous	Unincorporated
1926	-	428.5	Miscellaneous	Unincorporated
1927	-	2241.5	Unknown/Unidentified	Unincorporated
1928	-	259.5	Unknown/Unidentified	Unincorporated
1928	-	1412.0	Unknown/Unidentified	Unincorporated
1929	-	107.0	Unknown/Unidentified	Unincorporated
1931	RUBICON	1378.0	Unknown/Unidentified	Unincorporated

Year	Fire Name	Acreage	Cause	Jurisdiction
1931	-	392.0	Unknown/Unidentified	Unincorporated
1931	-	3296.9	Unknown/Unidentified	Unincorporated
1931	-	620.0	Unknown/Unidentified	Unincorporated
1934	-	678.1	Miscellaneous	Unincorporated
1936	-	21287.6	Unknown/Unidentified	Unincorporated
1939	-	523.3	Unknown/Unidentified	Unincorporated
1939	-	523.3	Unknown/Unidentified	Unincorporated
1944	-	243.5	Unknown/Unidentified	Unincorporated
1946	-	271.3	Lightning	Unincorporated
1948	-	130.0	Miscellaneous	Unincorporated
1949	STANFORD	125.5	Smoking	Unincorporated
1949	BALD MTN	1464.5	Smoking	Unincorporated
1949	ELLIOT RANCH	342.4	Lightning	Unincorporated
1950	BEACON	407.0	Unknown/Unidentified	Unincorporated
1950	HAMPSHIRE ROCK	201.4	Miscellaneous	Unincorporated
1951	EUREKA	221.1	Unknown/Unidentified	Unincorporated
1951	WIZWELL	1049.8	Unknown/Unidentified	Unincorporated
1951	HALSEY	480.6	Unknown/Unidentified	Unincorporated
1951	-	257.9	Miscellaneous	Unincorporated
1953	MOONEY	257.1	Unknown/Unidentified	Rocklin
1954	OMOHUNDRO	2027.0	Unknown/Unidentified	Unincorporated
1955	BROWN BAR CANYON	662.7	Unknown/Unidentified	Unincorporated
1956	SAM BABB	316.6	Unknown/Unidentified	Unincorporated
1958	LIGHTNING #6	551.2	Unknown/Unidentified	Unincorporated
1959	MADONNA #2	3164.1	Unknown/Unidentified	Unincorporated
1959	BIG RESERVOIR	299.2	Campfire	Unincorporated
1960	VOLCANO	42594.5	Smoking	Unincorporated
1960	VOLCANO	2135.7	Unknown/Unidentified	Unincorporated
1961	GREEN VALLEY	526.8	Unknown/Unidentified	Unincorporated
1961	GILLIS HILL	953.7	Unknown/Unidentified	Unincorporated
1961	AUBURN	672.4	Unknown/Unidentified	Unincorporated
1961	BILDERBACK	925.6	Unknown/Unidentified	Unincorporated
1961	AUBURN	418.6	Unknown/Unidentified	Unincorporated
1962	ROADSIDE #20	102.6	Unknown/Unidentified	Unincorporated
1964	ROADSIDE #51	3545.2	Unknown/Unidentified	Unincorporated
1964	PLACER ROADSIDE #51	1716.7	Unknown/Unidentified	Unincorporated
1964	BREWER	293.0	Unknown/Unidentified	Unincorporated
1965	APPLEGATE	3529.2	Unknown/Unidentified	Unincorporated
1965	SPRR #71	268.4	Unknown/Unidentified	Lincoln

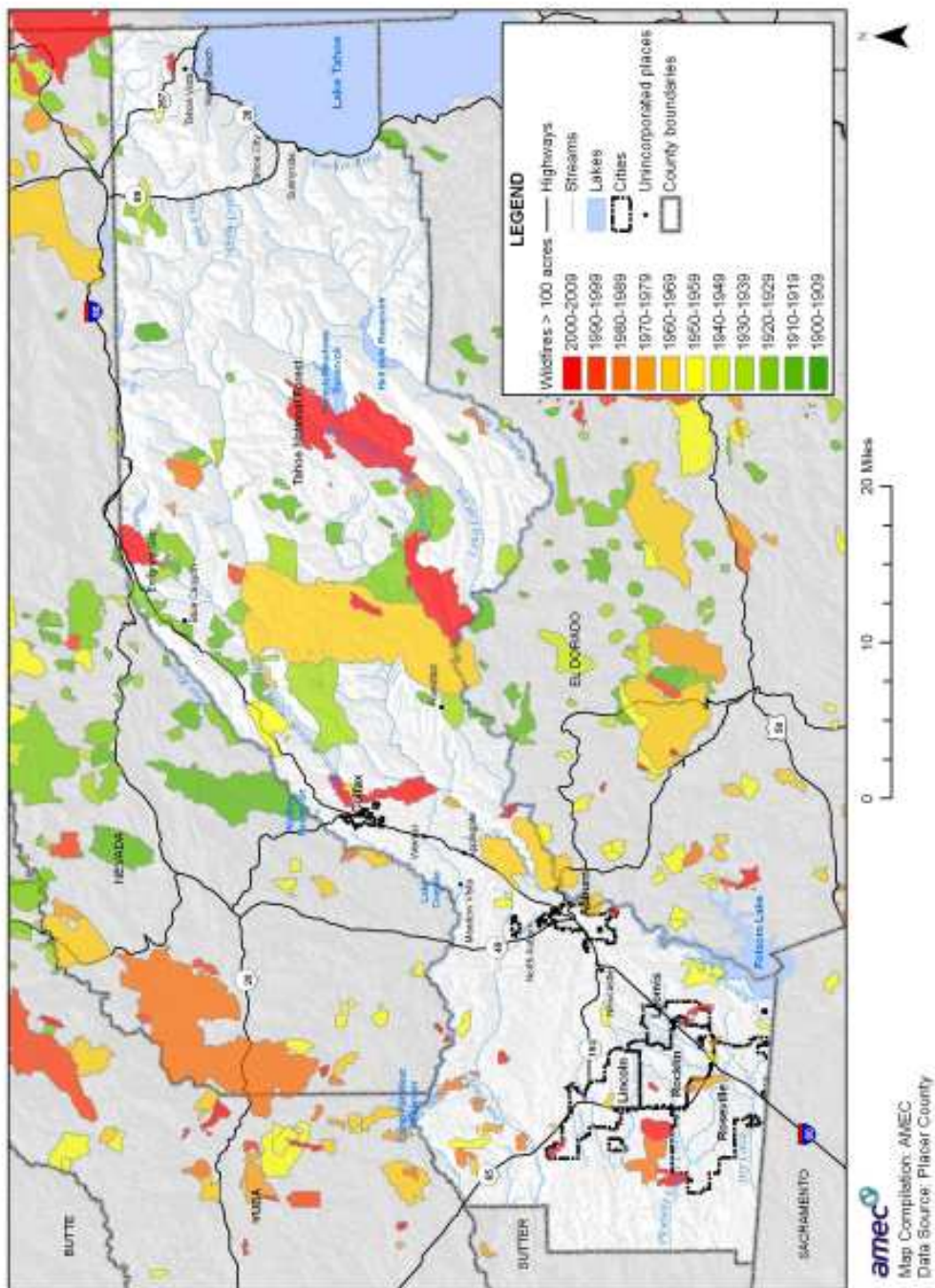
Year	Fire Name	Acreage	Cause	Jurisdiction
1967	-	157.2	Debris	Unincorporated
1969	IOWA HILL	464.4	Unknown/Unidentified	Unincorporated
1970	JACINTO	385.2	Unknown/Unidentified	Unincorporated
1970	PONDEROSA	296.7	Unknown/Unidentified	Unincorporated
1972	SIERRA COLLEGE	188.6	Unknown/Unidentified	Roseville
1976	GALE	187.4	Debris	Unincorporated
1979	ANIMAL	763.1	Unknown/Unidentified	Roseville
1980	ROSEVILLE	236.3	Unknown/Unidentified	Roseville
1980	DOG BAR	347.1	Unknown/Unidentified	Unincorporated
1981	PG&E #5	812.5	Equipment Use	Unincorporated
1981	NADEIC	425.2	Miscellaneous	Unincorporated
1982	ANDRESSEN	439.5	Equipment Use	Unincorporated
1983	NONE	820.9	Unknown/Unidentified	Unincorporated
1984	CURTIS	876.6	Unknown/Unidentified	Unincorporated
1985	ROADSIDE 3 4 5 6	1854.1	Unknown/Unidentified	Unincorporated
1985	DOG BAR	186.9	Smoking	Unincorporated
1986	-	551.6	Debris	Unincorporated
1986	SLATE	2040.2	Lightning	Unincorporated
1986	ROADSIDE 82	143.2	Unknown/Unidentified	Unincorporated
1986	ROADSIDE 83	189.2	Arson	Unincorporated
1987	CONOUCK	183.5	Equipment Use	Unincorporated
1987	BIG	894.5	Lightning	Unincorporated
1995	HELESTER	627.4	Equipment Use	Unincorporated
2000	DRIVERS	348.9	Smoking	Unincorporated
2000	AMERICAN	148.4	Unknown/Unidentified	Auburn
2001	GAP	2447.3	Campfire	Unincorporated
2001	STAR	16464.2	Miscellaneous	Unincorporated
2001	BLUE OAKS	1427.1	Miscellaneous	Unincorporated
2001	WHITNEY	142.6	Unknown/Unidentified	Rocklin
2001	MARTIS	14126.3	Campfire	Unincorporated
2001	LINCOLN CITY ASST	372.1	Arson	Lincoln
2001	PONDEROSA	2778.0	Vehicle	Unincorporated
2002	SIERRA	594.3	Vehicle	Loomis
2002	GARDEN	284.2	Power Line	Unincorporated
2003	CODFISH	841.4	Lightning	Unincorporated
2003	ROYAL	338.8	Debris	Unincorporated
2004	STEVENS	934.4	Structure	Unincorporated
2007	RALSTON	8420.8	Miscellaneous	Unincorporated
2007	PHILLIPS	935.6	Equipment Use	Unincorporated

Year	Fire Name	Acreage	Cause	Jurisdiction
2008	American River Complex	70,500	Lightning	Unincorporated
2008	Gladding	900	Lightning	Unincorporated

Source: Placer County

*Includes fires greater than 100 acres in size.

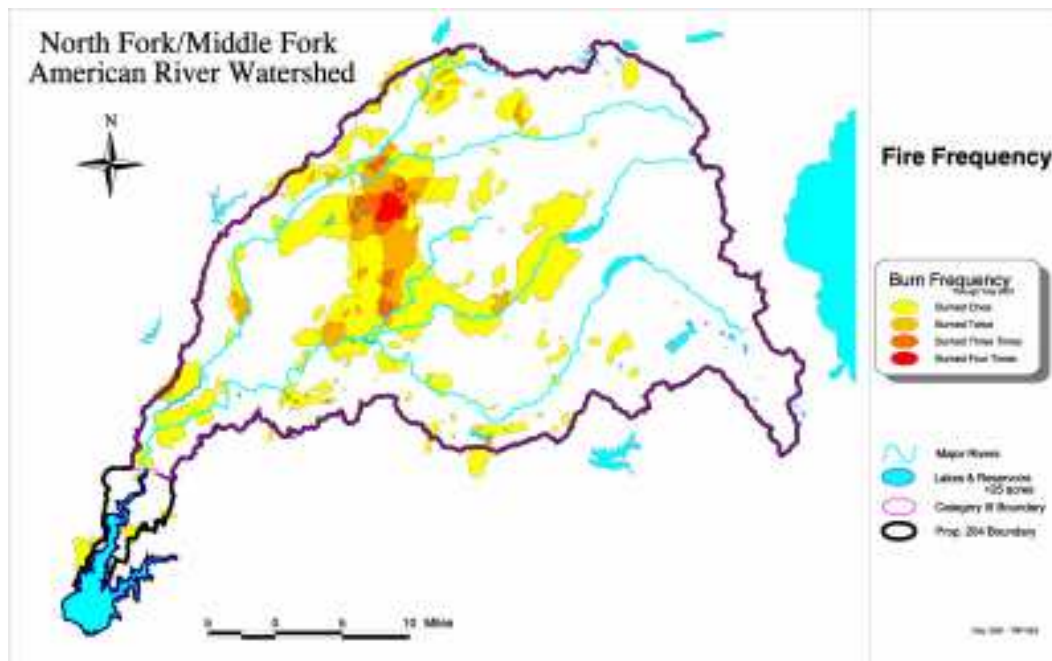
Figure 4.33. Placer County Fire History 1908 to 2008



It is important to note that in addition to the Placer County fire history detailed in the above tables and map, there are numerous smaller fires that occur in the area year after year, many of these a result of “roadside spots” along I-80. These smaller fires also have the ability to quickly get out of hand and become significant fires (e.g., the 2002 Sierra Fire). Also, fires small in acreage can result in large losses. A fire in the Heather Glen area in 2000 was only 10 acres, but resulted in \$350,000 in damages because a home was lost.

Of further interest are areas within the County that have burned multiple times. The following two maps, taken from the American River Watershed Group and the 2000 Lake Tahoe Watershed Assessment document, depict the frequency of burn areas within select areas of the County.

Figure 4.34. North Fork/Middle Fork Watershed Fire Frequency



(Source: American River Watershed Group)

Figure 4.35. Fire Occurrence in Lake Tahoe Basin

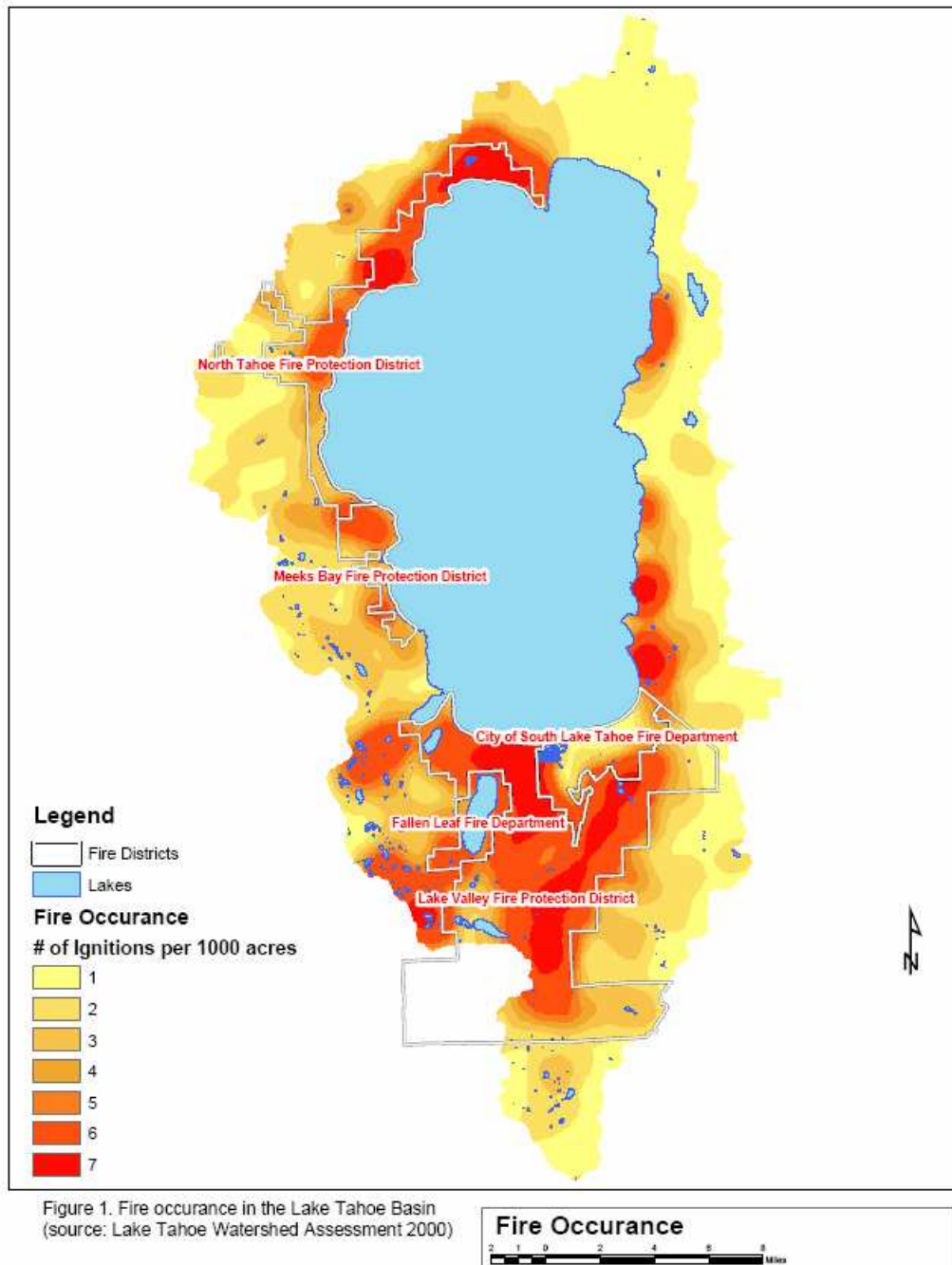


Figure 1. Fire occurrence in the Lake Tahoe Basin
(source: Lake Tahoe Watershed Assessment 2000)

The HMPC also provided the following information on historical fires in the County.

- **1975/1977 Sawmill Fire** – The Sawmill Fire and another fire occurred in the area of Cape Horn and the Alpine Meadows subdivision, just three miles northeast of Colfax.
- **1990 Placer County Fire** – This fire burned approximately 300 acres of grass, brush, and oaks in the area of Placer Canyon. The fire resulted in evacuations and destroyed several outbuildings.
- **2000 Heather Glen Fire** – The Heather Fire, caused by sparks from a lost trailer wheel along Interstate 80, destroyed one home and forced a neighborhood evacuation in Applegate. While only ten acres in size, this fire resulted in \$350,000 in damage.
- **August 12-20, 2001 Narrow Gauge Fire** – This fire near Colfax burned 30 acres and forced closure of I-80 for about an hour due to dense smoke. This fire, blamed on a catalytic converter, was quickly contained as California Department of Forestry air tankers were already in the area and able to respond quickly.
- **August 2001 Gap Fire** – The Gap Fire near Blue Canyon burned 2,462 acres of forest land and caused the closure of Interstate 80.
- **August 17-23, 2001 Ponderosa Fire** – This fire burned 2,780 acres.
- **August 25-September 13, 2001 Star Fire** – The Star Fire started in Eldorado National Forest and spread to Tahoe National Forest and burned approximately 16,761 acres.



Star Fire, August 26, 2001. Eldorado National Forest. Photo Courtesy of USFS.

- **2001 Martis Fire** – This fire east of Truckee burned 20,000 acres; threatened homes; shut down Interstate 80; and damaged railway trestles affecting Amtrak passenger train service. The heavy smoke caused poor air quality and raised health issues for individuals with respiratory problems. While the Martis Fire itself was not in Placer County, there were

significant impacts to the County as a result of this fire. The County also contributed major firefighting assistance.

- **2002, Sierra Fire** – Within the communities of Loomis and Granite Bay approximately 595 acres of grass, brush, and oaks burned in the area of Interstate 80, Barton Road, Wells Avenue, Morgan Place, Indian Springs, and Cavitt-Stallman Road. The fire destroyed six structures and threatened two schools. One hundred homes were evacuated, and more than 1,000 homes in both communities were threatened. FEMA provided federal funds to assist in fighting this wildfire.
- **2004 Stevens Fire** – The Stevens Fire located at Cape Horn/Iowa Hill near Colfax, was 100 percent contained at 934 acres.
- **2004 Numerous fires** – Numerous fires of varying sizes occurred in Placer County during the 2004 fire season. These include fires caused by equipment sparks, abandoned campfires, arson and undetermined causes.



Photos from website: <http://yubanet.com/stevenstrail.html>; courtesy of Roger Burdick



Photos from website: <http://yubanet.com/stevenstrail.shtml>; courtesy of Robin Yonash.

-
- **September 2006 Ralston Fire** – The Ralston Fire was a large wildland fire in the area of the North Fork of the Middle Fork of the American River. Approximately 8,400 acres burned.
 - **June 2007 Angora Fire** – Although not occurring in Placer County, the Angora fire in nearby El Dorado County (in the Lake Tahoe Basin) burned 3,100 acres of forest and wooded subdivisions and destroyed more than 250 homes as well as 75 commercial and other structures.
 - **August 2007 Washoe Fire** – The Washoe Fire started with a structure fire of a home located on the West Shore of Lake Tahoe near the Sunnyside Resort. The fire quickly engulfed one residence, spread to two others and moved into forestlands. The fire spread to two other homes and destroyed them as well. In all, 5 homes were destroyed and 20 acres of forestland burned. Extreme wind fueled and drove the fire, which significantly contributed to the rapid spread.
 - **June-July 2008 American River Complex Fire** - Several large wildland fires resulted from a system of major lightning storms that impacted the entire Northern CA region. In Placer County, approx. 10 wildland fires resulted from the lighting storm, and 4 grew to major fires, which later were collectively labeled the American River Complex (ARC) fires. The ARC fires were located in Tahoe National Forest in the North Fork American River watershed northeast of Foresthill, California. The fires consumed approx. 20,500 acres of forest land.
 - **September 2008 Gladding Fire** - The wind driven fire started northeast of Lincoln and consumed approximately 960 acres, six residences, and 10 outbuildings.

OTHER DETAILS FOR RECENT FIRES

Likelihood of Future Occurrences

Highly Likely— From May to October of each year, Placer County faces a serious wildland fire threat. Within the Nevada-Yuba-Placer Unit, fire occurrences range from 120 to 200 fires a year in the SRA and 1,400 to 1,600 fires in the LRAs. Fires will continue to occur on an annual basis in the Placer County planning area. The threat of wildfire and potential losses are constantly increasing as human development and population increase and the wildland urban interface areas expand. Due to its high fuel load and long, dry summers, most of Placer County continues to be at risk from wildfire.

4.2.21 Natural Hazards Summary

Table 4.16 summarizes the results of the hazard identification and hazard profile for the Placer County planning area based on the hazard identification data and input from the HMPC. For each hazard profiled in Section 4.2, this table includes the likelihood of future occurrence and whether the hazard is considered a priority hazard for the Placer County planning area.

Table 4.16. Hazard Identification/Profile Summary and Determination of Priority Hazard: Placer County Planning Area

Hazard	Likelihood of Future Occurrence	Vulnerability	Priority Hazard
Agricultural	Highly Likely	Medium	Yes
Avalanche	Likely	Low	No
Dam Failure	Occasional	High	Yes
Drought	Occasional	High	Yes
Earthquake	Occasional	Medium	Yes
Flood: 100-year flood	Occasional	High	Yes
Flood: Localized	Highly Likely	Medium	Yes
Human Health Hazards:			
Epidemic/Pandemic	Occasional	Medium	No
West Nile Virus	Highly Likely	Low	No
Landslide	Occasional	Low	Yes
Seiche	Unlikely	High	Yes
Severe Weather:			
Extreme Temperatures	Highly Likely	Medium	Yes
Fog	Occasional	Low	No
Heavy Rain/Thunderstorm/ Hail/Lightning/Wind	Highly Likely	High	Yes
Snow	Highly Likely	Medium	Yes
Tornado	Occasional	Low	No
Soil Hazards:			
Erosion	Likely	Low	No
Expansive Soils	Occasional	Low	No
Volcano	Unlikely	Low	No
Wildfire	Highly Likely	Extremely High	Yes

Source: HMPC

The HMPC determined that flood, wildfire, drought and winter storms, in the form of both rain and snow) are the most significant hazards in the planning area. The assets at risk and estimated potential losses associated with these hazards are discussed in Section 4.3 Vulnerability Assessment. Only those hazards determined to be priority hazards are discussed further in this plan.

4.3 Vulnerability Assessment

Requirement §201.6(c)(2)(ii): [The risk assessment shall include a] description of the jurisdiction's vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description shall include an overall summary of each hazard and its impact on the community.

Requirement §201.6(c)(2)(ii)(A): The plan should describe vulnerability in terms of the types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard areas.

Requirement §201.6(c)(2)(ii)(B): [The plan should describe vulnerability in terms of an estimate of the potential dollar losses to vulnerable structures identified in paragraph (c)(2)(i)(A) of this section and a description of the methodology used to prepare the estimate.

Requirement §201.6(c)(2)(ii)(C): [The plan should describe vulnerability in terms of] providing a general description of land uses and development trends within the community so that mitigation options can be considered in future land use decisions.

With Placer County's hazards identified and profiled, the HMPC conducted a vulnerability assessment to describe the impact that each hazard would have on the County. The vulnerability assessment quantifies, to the extent feasible using best available data, assets at risk to natural hazards and estimates potential losses. This section focuses on the risks to the County as a whole. Data from the individual participating jurisdictions was also evaluated and is integrated here and in the jurisdictional annexes, and noted where the risk differs for a particular jurisdiction within the planning area.

This vulnerability assessment followed the methodology described in the FEMA publication *Understanding Your Risks—Identifying Hazards and Estimating Losses*. The vulnerability assessment first describes the total vulnerability and values at risk and then discusses vulnerability by hazard.

Data used to support this assessment included the following:

- County GIS data (hazards, base layers, and assessor's data);
- Statewide GIS datasets compiled by the California Governor's Office of Emergency Services to support mitigation planning;
- CAL FIRE GIS datasets;
- FEMA's HAZUS-MH MR3 GIS-based inventory data (January 2005)
- Written descriptions of inventory and risks provided by participating jurisdictions;
- Existing plans and studies; and
- Personal interviews with planning team members and staff from the County and participating jurisdictions.

4.3.1 Placer County Vulnerability and Assets at Risk

As a starting point for analyzing the planning area's vulnerability to identified hazards, the HMPC used a variety of data to define a baseline against which all disaster impacts could be compared. If a catastrophic disaster was to occur in the planning area, this section describes significant assets at risk in the planning area. Data used in this baseline assessment included:

- Total values at risk;
- Critical facility inventory;
- Cultural, historical, and natural resources; and
- Growth and development trends.

Total Values at Risk

The following data from the Placer County Assessor's Office is based on the certified roll values for 2007. This data should only be used as a guideline to overall values in the County, as the information has some limitations. The most significant limitation is created by Proposition 13. Instead of adjusting property values annually, the values are not adjusted or assessed at fair market value until a property transfer occurs. As a result, overall value information is most likely low and does not reflect current market value of properties within the County. It is also important to note, in the event of a disaster, it is generally the value of the infrastructure or improvements to the land that is of concern or at risk. Generally, the land itself is not a loss. Table 4.17 shows the 2007 roll values for the entire Placer County planning area (i.e., the total values at risk) by jurisdiction. The roll values for unincorporated Placer County are provided in Table 4.18 by property type.

Table 4.17. 2007 Total Roll Values for Placer County Planning Area

2007 Certified Roll Values		
<i>City</i>	<i>Units</i>	<i>Total</i>
City of Auburn	5,656	\$1,558,772,240
City of Colfax	851	\$175,877,430
City of Lincoln	18,216	\$6,536,713,886
Town of Loomis	2,922	\$812,718,667
City of Rocklin	18,763	\$7,012,956,568
City of Roseville	40,961	\$16,472,092,919
Unincorporated County	69,906	\$22,745,540,397
		\$55,314,672,107

Source: 2007 Certified Roll Values, Placer County Assessor's Office

Table 4.18. 2007 Roll Values for Unincorporated Placer County

Unincorporated County		
Property Type	Units	Net Value
Residential	60,201	\$20,329,326,464
Commercial	2,500	\$1,421,747,391
Timeshares	4,597	\$33,237,145
Industrial	468	\$478,802,208
Agricultural	2,140	\$482,427,189
Total Value	69,906	\$22,745,540,397

Source: 2007 Certified Roll Values, Placer County Assessor's Office

Critical Facility Inventory

Of significant concern with respect to any disaster event is the location of critical facilities in the planning area. Critical facilities are often defined as those essential services and facilities in a major emergency which, if damaged, would result in severe consequences to public health and safety or a facility which, if unusable or unreachable because of a major emergency, would seriously and adversely affect the health, safety, and welfare of the public. Volume II of the Background Report to the Placer County General Plan, 1994 defines critical facilities as, "those services and facilities necessary during a major emergency." This definition was refined by separating out three categories of critical facilities.

Class 1 facilities include those facilities that contribute to command, control, communications and computer capabilities associated with managing an incident from initial response through recovery. Class 1 facilities include

- Primary and alternate Emergency Operations Centers (EOCs),
- All Dispatch Centers,
 - Sheriff Auburn
 - Sheriff Tahoe
 - CHP Sacramento
 - CHP Truckee
 - CAL FIRE Grass Valley
 - Roseville City
 - Rocklin City
 - Lincoln City
 - Auburn City
- Emergency Services Communication Infrastructure,
- Primary and Alternate Computer Information Systems Infrastructure,

-
- Sutter Roseville Hospital Control Facility, and
 - Major transportation corridors.

Class 2 facilities include those facilities that house Emergency Services capabilities. Class 2 facilities include

- All Police Stations,
 - Roseville
 - Rocklin
 - Lincoln
 - Auburn
- All CHP Stations,
 - Newcastle
 - Dutch Flat
 - Truckee
- All Fire Stations,
- All Hospitals,
 - Sutter Auburn Faith
 - Kaiser Roseville
 - Sutter Roseville
 - Tahoe Truckee
- All National Guard Armories,
- Coast Guard Facilities in Tahoe, and
- Airports
 - Lincoln
 - Auburn
 - Blue Canyon
 - Truckee

Class 3 facilities are those facilities that enable key utilities and can be used as evacuation centers/shelters/mass prophylaxis sites, etc. Class 3 facilities include

- All schools
- Water treatment plants
- Power generation infrastructure
- Fuel pipelines
- Fiber-optic lines
- Sewage infrastructure
- Fair Grounds in Auburn and in Roseville
- Memorial Halls
- Park Facilities

- Water-reactive materials

An inventory of critical facilities in the planning area based on data from Placer County GIS is provided in Table 4.19. An inventory of critical facilities in Unincorporated Placer County is provided in Tables 4.20 and 4.21. Due to the volume of data, communication infrastructure points and hydrants are not mapped and are only included in the Summary Table. Critical facility information specific to the incorporated communities are provided in the jurisdictional annexes.

Critical facilities in the unincorporated areas of the County are illustrated in Figure 4.19. More information on critical facilities in the participating jurisdictions can be found in the annexes.

Table 4.19. Placer County Planning Area Critical Facilities

Facility Type	Unincorporated	All Cities	County Totals
Airports	5	4	9
Animal Shelters	2		2
CalARP Facilities	8	2	10
CHP Stations	5	6	11
Communication Infrastructure	730	260	990
Correctional Facilities	3	1	4
Dispatch Centers	2	4	6
Emergency Operations Centers	2	4	6
Fairgrounds	-	2	2
Fire Stations	30	18	48
Halls	25	15	40
Hazmat Facilities	10	15	25
Hydrants	4,794	20,202	24,996
Medical Facilities	12	18	30
Police Stations	5	6	11
Public Utilities	76	24	98
Public Works	-	1	1
Schools	35	69	104
Train Stations	1	4	5
US Coast Guard	1	2	3
	5,746	20,657	26,401

Source: Placer County GIS

Table 4.20. Unincorporated Placer County Critical Facilities: Summary Table

Facility Type	Count
Airports	5
Animal Shelters	2
CalARP Facilities	8
CHP Stations	5
Correctional Facilities	3
Communication Infrastructure	730
Dispatch Centers	2
Emergency Operations Centers	2
Fire Stations	30
Halls	25
Hazmat Facilities	10
Hydrants	4,794
Medical Facilities	12
Police Stations	5
Public Utilities	76
Schools	35
Train Stations	1
US Coast Guard	1

5,744

Source needed

Table 4.21. Unincorporated Placer County Critical Facilities: Detailed Table

Facility Type	Facility Class	Facility name	Facility Address
Airports	Class 2	Holtsman Airport	no data
Airports	Class 2	Holsclaws Stol Strip Stolport	no data
Airports	Class 2	Auburn CDF Heliport	no data
Airports	Class 2	Homewood Seaplane Base	no data
Airports	Class 2	Blue Canyon-Nyack Airport	no data
Animal Shelters	Class 3	Auburn Shelter	11251 B Ave., Auburn
Animal Shelters	Class 3	Tahoe Vista Government Center	849 Shelter Road, Tahoe Vista
CalARP Facilities	Class 2	Enterprise Products Oper LP	1545 Nichols Drive

Facility Type	Facility Class	Facility name	Facility Address
CalARP Facilities	Class 2	NID/Locksley	12200 Locksley Lane
CalARP Facilities	Class 2	PCWA - Bowman Treatment	595 Christian Valley Rd
CalARP Facilities	Class 2	PCWA - Foothill Treatment	9300 Powerhouse Rd
CalARP Facilities	Class 2	Placer County DPW	11755 Joeger Road
CalARP Facilities	Class 2	Placer County DPW	11755 Joeger Road
CalARP Facilities	Class 2	Rio Bravo Rocklin	3100 Thunder Valley Ct
CalARP Facilities	Class 2	San Juan Suburban Water Dist	9935 Auburn Folsom Rd
CHP Stations	Class 2	Auburn Main Station	2929 Richardson Dr
CHP Stations	Class 2	Foresthill Service Center	24580 Main St
CHP Stations	Class 2	Granite Bay Service Center	4120 Douglas Blvd #303
CHP Stations	Class 2	Kings Beach Service Center	8645 N. Lake Blvd
CHP Stations	Class 2	Tahoe Substation	2501 N.lake Blvd
Correctional Facilities	Class 2	Placer County Jail	no data
Correctional Facilities	Class 2	Placer County Juvenile Detention Center	no data
Correctional Facilities	Class 2	Burton Creek Sub-Station	no data
Dispatch Centers	Class 1	Placer County Sheriff-Auburn	2929 Richardson Dr
Dispatch Centers	Class 1	Placer County Sheriff-Tahoe City	2501 N. lake Blvd
Emergency Operations Centers	Class 1	Placer County OES	2968 Richardson Dr
Emergency Operations Centers	Class 1	County - Tahoe	2501 N Lake Blvd
Fire Stations	Class 2	Foresthill Fire Protection District	5981 Gold St
Fire Stations	Class 2	Iowa Hill Fire Department	3350 Iowa Hill Rd
Fire Stations	Class 2	Newcastle Fire District	9211 Cypress St
Fire Stations	Class 2	North Tahoe Fire Protection	300 North Lake Blvd
Fire Stations	Class 2	North Tahoe Fire Protection	288 Northshore Blvd
Fire Stations	Class 2	North Tahoe Fire Protection	5425 West Lake Blvd
Fire Stations	Class 2	North Tahoe Fire Protection	159 Observation Dr
Fire Stations	Class 2	North Tahoe Fire Protection	240 Carnelian Bay Av
Fire Stations	Class 2	Norstar Fire Department	910 Northstar Dr
Fire Stations	Class 2	Penryn Fire Protection	7206 Church St
Fire Stations	Class 2	Placer Consolidated Fire District	11645 Atwood Rd
Fire Stations	Class 2	Placer Consolidated Fire District	9305 Wise Rd
Fire Stations	Class 2	Placer Consolidated Fire District	12996 Luther Rd
Fire Stations	Class 2	Placer Consolidated Fire District	6150 Grass Valley Hwy
Fire Stations	Class 2	Placer County Fire Department	8350 Cook Riolo Rd
Fire Stations	Class 2	Placer Hills Fire Protection	16999 Placer Hills Rd
Fire Stations	Class 2	South Placer Fire Protection	4650 East Roseville Pkwy
Fire Stations	Class 2	South Placer Fire Protection	5300 Olive Ranch Rd

Facility Type	Facility Class	Facility name	Facility Address
Fire Stations	Class 2	South Placer Fire Protection	6900 Eureka Rd
Fire Stations	Class 2	South Placer Fire Protection	7070 Auburn Folsom Rd
Fire Stations	Class 2	South Placer Fire Protection	3505 Auburn Folsom Rd
Fire Stations	Class 2	Squaw Valley Fire Department	305 Squaw Valley Rd
Fire Stations	Class 2	North Tahoe Fire Protection	270 Alpine Meadows Rd
Fire Stations	Class 2	Alta Fire Protection District	33950 Alta Bonny Nook Rd
Fire Stations	Class 2	Colfax Volunteer Fire Department	24202 Fowler Ave
Fire Stations	Class 2	Applegate Fire Station	18016 Applegate Rd
Fire Stations	Class 2	Weimar Fire Station	100 W Weimar Cross Rd
Fire Stations	Class 2	Foresthill Fire Protection District	22700B Foresthill Rd
Fire Stations	Class 2	Foresthill Fire Protection District	20540 Foresthill Rd
Fire Stations	Class 2	Foresthill Fire Protection District	24320 Main St
Halls	Class 3	Gold Hill Grange #326	1951 Quail Rd.
Halls	Class 3	Oddfellows Lodge #81 IO	P O Box 111, Newcastle
Halls	Class 3	S P R S Y et al	P O Box 993, Newcastle
Halls	Class 3	Dutch Flat Community Club	P O Box 14, Dutch Flat
Halls	Class 3	Auburn Trapshooting Club Corporation	11540 Lorenson Rd.
Halls	Class 3	McCauley Keith & Kari	P O Box 1271, Truckee
Halls	Class 3	Lake Tahoe Labor Temple Association	P O Box 442, Kings Beach
Halls	Class 3	Tahoe City Public Utility District	P O Box 33, Tahoe City
Halls	Class 3	Mount Vernon Grange	P O Box 6208, Auburn
Halls	Class 3	Talmont Resort Improvement District	P O Box 10618, Tahoe City
Halls	Class 3	Squaw Creek Associates	P O Box 130188, Carlsbad
Halls	Class 3	Squaw Valley Road LLC	P O Box 3712, Olympic Valley
Halls	Class 3	Placer County Farm Bureau	10120 Ophir Rd.
Halls	Class 3	Lakeview Hills Community Association	P O Box 2131, Granite Bay
Halls	Class 3	Oakridge Mutual Water Co	135 Squire Ln.
Halls	Class 3	Fruitvale Community Hall Corp	P O Box 58, Lincoln
Halls	Class 3	Clay Lodge Masonic Temple Association	P O Box 599, Alta
Halls	Class 3	Dutch Flat Swimming Pool Corporation	P O Box 20, Dutch Flat
Halls	Class 3	County of Placer	24601 Harrison St.
Halls	Class 3	Long Valley Grange #642	1960 Auburn Folsom Rd.
Halls	Class 3	Penryn Mason Bldg Association	P O Box 379, Penryn
Halls	Class 3	Central School District Community Hall Corp	1445 Fiddymont Rd.
Halls	Class 3	Thermalands Community Center	2510 Auburn Rd.
Halls	Class 3	Japan American Citizens League	P O Box 212, Penryn
Halls	Class 3	Leland Stanford Jr Univ et al	PO Box 10618

Facility Type	Facility Class	Facility name	Facility Address
Hazmat Facilities	Class 2	PLACER COUNTY SMD 1 WASTEWATER TREATMENT PLANT	11755 JOEGER ROAD
Hazmat Facilities	Class 2	VULCAN MATERIALS COMPANY ROSEVILLE	9800 DEL ROAD
Hazmat Facilities	Class 2	CEMEX LINCOLN	2680 ATHENS RD
Hazmat Facilities	Class 2	LIVINGSTON'S CONCRETE SERVICE INC PLANT 3	2660 ATHENS AVE
Hazmat Facilities	Class 2	REPLACON INC	5875 CAMP FAR W RD
Hazmat Facilities	Class 2	BALL METAL BEVERAGE CONTAINER CORPORATION	3939 CINCINNATI AVE.
Hazmat Facilities	Class 2	AUBURN WWTP	10441 OPHIR RD
Hazmat Facilities	Class 2	FORMICA CORPORATION	3500 CINCINNATI AVENUE
Hazmat Facilities	Class 2	DRY CREEK REGIONAL WASTEWATER TREATMENT PLANT	1800 BOOTH ROAD
Hazmat Facilities	Class 2	ALPHA DYNO NOBEL	3400 NADER RD
Medical Facilities	Class 2	SUTTER AUBURN FAITH HOSPITAL	11815 EDUCATION ST
Medical Facilities	Class 2	COLONIAL HEALTHCARE	12225 SHALE RIDGE LANE
Medical Facilities	Class 2	FOOTHILL OAKS CARE CENTER	3400 BELL RD
Medical Facilities	Class 2	SIENA CARE CENTER	11600 EDUCATION ST
Medical Facilities	Class 2	CHAPA-DE INDIAN HEALTH PROGRAM, INC	11670 ATWOOD RD
Medical Facilities	Class 2	AUBURN SURGERY CENTER	3123 PROFESSIONAL DR
Medical Facilities	Class 2	PLACER COUNTY MEDICAL CLINIC- RURAL HEALTH	11583 C AVE
Medical Facilities	Class 2	PLACER MEDICAL CLINIC - TAHOE (RH)	8665 SALMON AVE
Medical Facilities	Class 2	SOUTH PLACER SURGERY CENTER, L.P.	8723 SIERRA COLLEGE BLVD
Medical Facilities	Class 2	AUBURN DIALYSIS	3126 PROFESSIONAL DR
Medical Facilities	Class 2	SUTTER AUBURN FAITH VNA AND HOSPICE	11795 EDUCATION ST
Medical Facilities	Class 2	PROGRESSIVE HOME CARE - AUBURN	11879 KEMPER RD
Police Stations	Class 2	Auburn Main Station	2929 Richardson Dr
Police Stations	Class 2	Foresthill Service Center	24580 Main St
Police Stations	Class 2	Granite Bay Service Center	4120 Douglas Blvd #303
Police Stations	Class 2	Kings Beach Service Center	8645 N. Lake Blvd
Police Stations	Class 2	Tahoe Substation	2501 N. Lake Blvd
Public Utilities	Class 3	NTPUD Kingswood West Booster Pump Station	no data
Public Utilities	Class 3	NTPUD D-2 Sewer Lift Station	no data
Public Utilities	Class 3	NTPUD D-3 Sewer Lift Station	no data

Facility Type	Facility Class	Facility name	Facility Address
Public Utilities	Class 3	NTPUD D-4 Sewer Lift Station	no data
Public Utilities	Class 3	NTPUD D-5 Sewer Lift Station	no data
Public Utilities	Class 3	NTPUD D-6 Sewer Lift Station	no data
Public Utilities	Class 3	NTPUD D-7 Sewer Lift Station	no data
Public Utilities	Class 3	NTPUD Mashie Sewer Lift Station	no data
Public Utilities	Class 3	NTPUD D-1 Sewer Lift Station	no data
Public Utilities	Class 3	NTPUD C-2 Sewer Lift Station	no data
Public Utilities	Class 3	NTPUD N-2 Sewer Lift Station	no data
Public Utilities	Class 3	NTPUD N-3 Sewer Lift Station	no data
Public Utilities	Class 3	NTPUD C-1 Sewer Lift Station	no data
Public Utilities	Class 3	Foothill 100,000 Gal. Backwash Tank	no data
Public Utilities	Class 3	Foothill 10mg Tank	no data
Public Utilities	Class 3	Foothill 1.0mg Tank	no data
Public Utilities	Class 3	Bowman 1.0mg Tank	no data
Public Utilities	Class 3	Bowman 10mg Tank	no data
Public Utilities	Class 3	Bowman 100,000 Gal. Backwash Tank #2	no data
Public Utilities	Class 3	Bowman 100,000 Gal. Backwash Tank #1	no data
Public Utilities	Class 3	Monte Vista 0mgd Water Treatment Plant	no data
Public Utilities	Class 3	Foothill 55 mgd Water Treatment Plants	no data
Public Utilities	Class 3	Bowman 7 mgd Water Treatment Plants	no data
Public Utilities	Class 3	Foresthill Public Utility District	24540 Main St
Public Utilities	Class 3	Foresthill Public Utility District	25985 Foresthill Rd
Public Utilities	Class 3	NTPUD	875 National Ave
Public Utilities	Class 3	Placer County SMD NO 1 Wastewater Treatment Plant	11755 Joeger Rd
Public Utilities	Class 3	San Juan Suburban Water Treatment Plant	9935 Auburn Folsom Rd
Public Utilities	Class 3	NID North Auburn Water Treatment Plant	12200 Locksley Ln
Public Utilities	Class 3	Placer County SMD NO 3 Wastewater Treatment Plant	4928 Auburn Folsom Rd
Public Utilities	Class 3	NID Edgewood Reservoir	Blitz Ln
Public Utilities	Class 3	Newcastle Sanitary Treatment Plant	no data
Public Utilities	Class 3	NTPUD S-1 Sewer Lift Station	no data
Public Utilities	Class 3	NTPUD S-2 Sewer Lift Station	no data
Public Utilities	Class 3	NTPUD 500,000 Gal. Water Tank	no data
Public Utilities	Class 3	NTPUD 500,000 Gal. Water Tank	1400 Kings Vista Ct
Public Utilities	Class 3	NTPUD Carnelian Woods #2 500,000 Gal. Water Tank	no data

Facility Type	Facility Class	Facility name	Facility Address
Public Utilities	Class 3	NTPUD Carnelian Woods #1 500,000 Gal. Water Tank	no data
Public Utilities	Class 3	NTPUD Carnelian Woods #2 Booster Pump Station	no data
Public Utilities	Class 3	NTPUD National Ave Sewer Lift Station	7010 North Lake Blvd
Public Utilities	Class 3	NTPUD Carnelian Woods Well #1	no data
Public Utilities	Class 3	NTPUD Secline St. Sewer Lift Station	141 Secline St
Public Utilities	Class 3	NTPUD Dollar Hill 350,000 Gal. Water Tank	no data
Public Utilities	Class 3	NTPUD Park Well	6600 Donner Rd
Public Utilities	Class 3	NTPUD Dollar Main Sewer Lift Station	3630 North Lake Blvd
Public Utilities	Class 3	NTPUD 500,000 Gal. Water Tank	no data
Public Utilities	Class 3	NTPUD Kingswood Booster Pump Station	no data
Public Utilities	Class 3	NTPUD 120,000 Gal. Water Tank	no data
Public Utilities	Class 3	NTPUD Moondunes Sewer Lift Station	7496 North Lake Blvd
Public Utilities	Class 3	NTPUD Carnelian Main Sewer Lift Station	275 Onyx Dr
Public Utilities	Class 3	Turner Pump Station	no data
Public Utilities	Class 3	Applegate WTP Pump Station	no data
Public Utilities	Class 3	Ophir Pump Station	no data
Public Utilities	Class 3	Tinker Rd Pump Station	no data
Public Utilities	Class 3	Foothill Pump Station	no data
Public Utilities	Class 3	Auburn Tunnel Pump Station	no data
Public Utilities	Class 3	Schaffer Mill Rd 500,000 Gal. Tank	no data
Public Utilities	Class 3	Tinker Rd 10,000,000 Gal. Tank	no data
Public Utilities	Class 3	Penryn 1,000,000 Gal. Tank	no data
Public Utilities	Class 3	Newcastle 1,000,000 Gal. Tank	no data
Public Utilities	Class 3	Los Lagos 1,600,000 Gal. Tank	no data
Public Utilities	Class 3	Channel Hill 1,000,000 Gal. Tank	no data
Public Utilities	Class 3	Bianchi 100,000 Gal. Tank	no data
Public Utilities	Class 3	Bell Rd 1,000,000 Gal. Tank	no data
Public Utilities	Class 3	Monte Vista 60,000 Gal. Tank	no data
Public Utilities	Class 3	Applegate Tank 100,000 Gal. Tank	no data
Public Utilities	Class 3	Alta Plant Tank #2 100,000 Gal. Tank	no data
Public Utilities	Class 3	Alta Tank #1 100,000 Gal. Tank	no data
Public Utilities	Class 3	Auburn 6mgd Water Treatment Plant	no data
Public Utilities	Class 3	Applegate 0mgd Water Treatment Plant	no data
Public Utilities	Class 3	Alta 0mgd Water Treatment Plant	no data
Public Utilities	Class 3	NTPUD 500,000 Gal. Water Tank	North Tahoe Recreation Park

Facility Type	Facility Class	Facility name	Facility Address
Public Utilities	Class 3	NTPUD Sewer Lift Station	North Tahoe Recreation Park
Public Utilities	Class 3	Water Treatment Plant & Lake Intake	7010 North Lake Blvd.
Schools	Class 3	Oakhills Elementary School	9233 Twin School Rd.
Schools	Class 3	Ridgeview Elementary School	9177 Twin School Rd.
Schools	Class 3	Newcastle Charter School	8951 Valley View Dr.
Schools	Class 3	Newcastle Elementary School	8951 Valley View Dr.
Schools	Class 3	Alta-Dutch Flat Elementary School	34050 Alta Bonnie Nook Rd.
Schools	Class 3	Maidu High School	3775 Richardson Dr.
Schools	Class 3	Chana High School	3775 Richardson Dr.
Schools	Class 3	Bowman School	13777 Bowman Rd.
Schools	Class 3	Foresthill High School	23319 Foresthill Rd.
Schools	Class 3	Colfax Elementary School	24825 Ben Taylor Rd.
Schools	Class 3	PCOE K-8 Community Independent Study Home	16825 Placer Hills Rd.
Schools	Class 3	North Tahoe High School	2945 Polaris Rd.
Schools	Class 3	North Tahoe Middle School	2945 Polaris Rd.
Schools	Class 3	Auburn Elementary School	11400 Lariat Ranch Rd.
Schools	Class 3	Colfax High School	24995 Ben Taylor Rd.
Schools	Class 3	Dry Creek Elementary School	2955 PFE Rd.
Schools	Class 3	Emigrant Gap Elementary School	42420 Emigrant Gap Rd.
Schools	Class 3	Eureka Elementary School	5477 Eureka Rd.
Schools	Class 3	Foresthill Divide Middle School	22888 Foresthill Rd.
Schools	Class 3	Foresthill Elementary School	24750 Main St.
Schools	Class 3	Franklin Elementary School	7050 Franklin School Rd.
Schools	Class 3	Granite Bay High School	1 Grizzly Way
Schools	Class 3	Greenhills Elementary School	8200 Greenhills Way
Schools	Class 3	Kings Beach Elementary School	8125 Steelhead
Schools	Class 3	Ophir Elementary School	1373 Lozanos Rd.
Schools	Class 3	Penryn Elementary School	6885 English Colony Way
Schools	Class 3	Placer Elementary School	8650 Horseshoe Bar Rd.
Schools	Class 3	Rock Creek Elementary School	3050 Bell Rd.
Schools	Class 3	Secret Ravine School	645 Kentucky Greens Way
Schools	Class 3	Sheridan Elementary School	4730 H St.
Schools	Class 3	Sierra Hills Elementary School	16505 Placer Hills Rd.
Schools	Class 3	Tahoe Lake Elementary School	375 Grove St.
Schools	Class 3	Weimar Hills Middle School	200 West Weimar Cross Rd.
Schools	Class 3	Willma Cavitt Junior High School	7200 Fuller Dr.
Schools	Class 3	Coldstream Alternative School	740 Timberland Ln.

<i>Facility Type</i>	<i>Facility Class</i>	<i>Facility name</i>	<i>Facility Address</i>
Train Stations	Class 2	Southern Pacific Trans Co	14310 Musso Rd
US Coast Guard Facilities	Class 2	U.S. Coast Guard Station Lake Tahoe	2500 Lake Forest Rd

Source: Placer County

Cultural, Historical, and Natural Resources

Assessing Placer County's vulnerability to disaster also involves inventorying the natural, historical, and cultural assets of the area. This step is important for the following reasons:

- The community may decide that these types of resources warrant a greater degree of protection due to their unique and irreplaceable nature and contribution to the overall economy.
- In the event of a disaster, an accurate inventory of natural, historical and cultural resources allows for more prudent care in the disaster's immediate aftermath when the potential for additional impacts is higher.
- The rules for reconstruction, restoration, rehabilitation, and/or replacement are often different for these types of designated resources.
- Natural resources can have beneficial functions that reduce the impacts of natural hazards, for example, wetlands and riparian habitat which help absorb and attenuate floodwaters and thus support overall mitigation objectives.

Cultural and Historical Resources

Placer County has a large stock of historically significant homes, public buildings, and landmarks. To inventory these resources, the HMPC collected information from a number of sources. The California Department of Parks and Recreation Office of Historic Preservation (OHP) was the primary source of information. The OHP is responsible for the administration of federally and state mandated historic preservation programs to further the identification, evaluation, registration, and protection of California's irreplaceable archaeological and historical resources. OHP administers the National Register of Historic Places, the California Register of Historical Resources, California Historical Landmarks, and the California Points of Historical Interest programs. Each program has different eligibility criteria and procedural requirements.

- The **National Register of Historic Places** is the nation's official list of cultural resources worthy of preservation. The National Register is part of a national program to coordinate and support public and private efforts to identify, evaluate, and protect historic and archeological resources. Properties listed include districts, sites, buildings, structures, and objects that are significant in American history, architecture, archeology, engineering, and culture. The National Register is administered by the National Park Service, which is part of the U.S. Department of the Interior.
- The **California Register of Historical Resources** program encourages public recognition and protection of resources of architectural, historical, archeological, and cultural

significance and identifies historical resources for state and local planning purposes; determines eligibility for state historic preservation grant funding; and affords certain protections under the California Environmental Quality Act. The Register is the authoritative guide to the state's significant historical and archeological resources.

- **California Historical Landmarks** are sites, buildings, features, or events that are of **statewide** significance and have anthropological, cultural, military, political, architectural, economic, scientific or technical, religious, experimental, or other value. Landmarks #770 and above are automatically listed in the California Register of Historical Resources.
- **California Points of Historical Interest** are sites, buildings, features, or events that are of **local (city or county)** significance and have anthropological, cultural, military, political, architectural, economic, scientific or technical, religious, experimental, or other value. Points designated after December 1997 and recommended by the State Historical Resources Commission are also listed in the California Register.

Historical resources included in the programs above are identified in Table 4.22.

Table 4.22. Placer County Historical Resources

Resource Name (Plaque Number)	National Register	State Landmark	Point of Interest	Date Listed	City
Allen & Sandhorfer Blacksmith, Auburn Iron Works (P619)			x	8/16/1983	Auburn
Auburn Grammar School, Auburn Civic Center Project (P693)			x	3/3/1988	Auburn
Auburn IOOF Hall (P803)			x	8/23/1994	Auburn
Auburn Public Library, Old Auburn Library (P838)			x	9/11/2000	Auburn
Baxter (P618)			x	8/16/1983	Dutch Flat
Buckner's Bar (P354)			x	11/19/1974	Auburn
Burns Home, Howell Home (P656)			x	7/2/1985	Auburn
Butcher Ranch (P357)			x	11/19/1974	Auburn
City of Auburn (404)				4/14/1948	Auburn
Clipper Gap (P359)		x	x	11/19/1974	Auburn
Colfax Freight Depot (N2076)	x			12/17/1999	Colfax
Colfax Passenger Depot (N2044)	x			1/15/1999	Colfax
Dutch Flat Historic District (N219)	x			3/28/1973	Dutch Flat
Emigrant Gap (403)		x		4/14/1948	Emigrant Gap
Finnish Temperance Hall, Finn Hall (P664)			x	8/20/1985	Rocklin
First Transcontinental Railroad-Auburn (780)		x		11/20/1962	Auburn
First Transcontinental Railroad-Colfax (780)		x		11/20/1962	Colfax

Resource Name (Plaque Number)	National Register	State Landmark	Point of Interest	Date Listed	City
First Transcontinental Railroad-Newcastle (780)		x		11/20/1962	Newcastle
First Transcontinental Railroad-Rocklin (780)		x		11/20/1962	Rocklin
First Transcontinental Railroad-Roseville (780)		x		11/20/1962	Roseville
Griffith Residence (P517)			x	12/1/1977	Penryn
Griffith House (N725)	x			12/19/1978	Penryn
Griffith Quarry (885)		x		5/9/1975	Penryn
Griffith Quarry (N522)	x			10/20/1977	Penryn
Grizzly Bear House (P355)			x	11/19/1974	Auburn
Haman House (N451)	x			11/17/1976	Roseville
Historic Gatekeeper's Log House (P228)			x	10/5/1971	Tahoe City
Iowa Hill (401)		x		4/14/1948	Iowa Hill
Lake Tahoe Dam (N948)	x			3/25/1981	Tahoe City
Lake Tahoe Outlet Gates (797)		x		9/16/1964	Tahoe City
Liberty House (P356)			x	11/19/1974	Auburn
Lincoln Public Library (N1660)	x			12/10/1990	Lincoln
Masonic Temple, Masonic Hall (P821)			x	5/15/1996	Auburn
Michigan Bluff-Last Chance Trail (N1779)	x			6/26/1992	Michigan Bluff
Mountain Quarries Bridge (N2227)	x			2/11/2004	Auburn
Newcastle Fruit Sheds (P836)			x	3/15/2000	Newcastle
Newcastle Portuguese Hall (P578)	x		x	12/21/1981	Newcastle
Old Auburn Historic District (N62)	x			12/29/1970	Auburn
Ophir (463)		x		8/30/1950	Auburn
Outlet Gates and Gatekeeper's Cabin (N198)	x			12/13/1972	Tahoe City
Overland Emigrant Trail (799)		x		9/16/1964	Soda Springs
Pioneer Express Trail (585)		x		5/22/1957	Folsom
Pioneer Ski Area of America, Squaw Valley (724)		x		1/18/1960	Squaw Valley
Sheridan Cash Store (P728)			x	8/17/1990	Sheridan
Spring Garden School (P361)			x	11/19/1974	Auburn
Stevens Trail (N2181)	x			11/20/2002	Colfax
Strap Ravine Nisenan Maidu Indian Site (N200)	x			1/8/1973	Roseville

Resource Name (Plaque Number)	National Register	State Landmark	Point of Interest	Date Listed	City
Summit Soda Springs (N720)	x			12/15/1978	Soda Springs
Todd's Valley (P358)			x	11/19/1974	Auburn
Town of Dutch Flat (397)		x		4/14/1948	Dutch Flat
Town of Forest Hill (399)		x		4/14/1948	Forest Hill
Town of Gold Run (405)		x		4/14/1948	Gold Run
Town of Michigan Bluff (402)		x		4/14/1948	Michigan Bluff
U.S. Ranch (P360)			x	11/19/1974	Auburn
Virginiatown (400)		x		4/14/1948	Newcastle
Watson Log Cabin (N798)	x			8/24/1979	Tahoe City
Woman's Club of Lincoln (N2134)	x			5/30/2001	Lincoln
Yankee Jim's (398)		x		4/14/1948	Foresthill

Source: California Department of Parks and Recreation Office of Historic Preservation, <http://ohp.parks.ca.gov/>

The National Park Service administers two programs that recognize the importance of historic resources, specifically those pertaining to architecture and engineering. While inclusion in these programs does not give these structures any sort of protection, they are valuable historic assets.

The **Historic American Buildings Survey (HABS)** and **Historic American Engineering Record (HAER)** document America's architectural and engineering heritage. The following table lists the HABS and HAER structures in Placer County:

Table 4.23. Placer County HABS and HAER Structures

Area	Historic Building/Structure
Applegate vicinity	
	Central Pacific Transcontinental Railroad, Tunnel "O", Milepost 132.69
	Central Pacific Transcontinental Railroad, Tunnel No. 23, Milepost 132.69
	Central Pacific Transcontinental Railroad, Tunnel No. 24, Milepost 132.9
	Central Pacific Transcontinental Railroad, Tunnel No. 25, Milepost 133.09
	Central Pacific Transcontinental Railroad, Tunnel No. 26, Milepost 133.29
	Central Pacific Transcontinental Railroad, Tunnel No. 27, Milepost 133.9
	Central Pacific Transcontinental Railroad, Tunnel No. 28, Milepost 134.75
	Central Pacific Transcontinental Railroad, Tunnel No. 29, Milepost 135.95
Auburn vicinity	
	Auburn (Chinese Section), General View
	Auburn, General View
	Commercial Buildings
	Fire House & Commercial Buildings, Grass Valley & Sacramento Roads

Area	Historic Building/Structure
	Henry Stone House, Nevada Street
	Lincoln Way & Maple Street (Commercial Building)
	Old Town City Hall (Ruins)
	Rock Creek Dam, East end of Rock Creek Road
Blue Canyon vicinity	
	Central Pacific Transcontinental Railroad, Tunnel No.1, Milepost 164.34
Cisco	
	Central Pacific Transcontinental Railroad, Tunnel No. 3, Milepost 180.65
	Central Pacific Transcontinental Railroad, Tunnel No. 38, Milepost 180.58
	Central Pacific Transcontinental Railroad, Tunnel No. 39, Milepost 180.95
	Central Pacific Transcontinental Railroad, Tunnel No. 4, Milepost 180.95
Clipper Gap	
	Central Pacific Railroad, Clipper Gap Tunnel
Colfax vicinity	
	Central Pacific Transcontinental Railroad, Tunnel No. 34, Milepost 145.4
Donner	
	Central Pacific Transcontinental Railroad, Tunnel No. 41, Milepost 193.3
Newcastle	
	Central Pacific Transcontinental Railroad, Tunnel No. 18, Milepost 120.5
Roseville	
	Southern Pacific Railroad Shasta Route, Roseville to Black Butte

Source: The Library of Congress, American Memory, http://memory.loc.gov/ammem/collections/habs_haer/

A 1988 publication from the state's Office of Historical Preservation (OHP) identified five "ethnic historic sites" in Placer County. *Five Views: An Ethnic Historic Site Survey for California* was originally conceived to broaden the spectrum of ethnic community participation in historic preservation activities and to provide better information on ethnic history and associated sites. The five sites in Placer County identified in the OHP survey are listed below:

- Duke Luster House
- Auburn Chinese American Cemetery
- Auburn Chinese American Community
- Chinese Store
- Tsuda's Store.

It should be noted that these lists may not be complete, as they may not include those currently in the nomination process and not yet listed. Additionally, as defined by the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA), any property over 50 years of age is considered a historic resource and is potentially eligible for the National Register. Thus, in the event that the property is to be altered, or has been altered, as the result of a major federal action, the property must be evaluated under the guidelines set forth by

CEQA and NEPA. Structural mitigation projects are considered alterations for the purpose of this regulation.

Natural Resources

Natural resources are important to include in cost/benefit analyses for future projects and may be used to leverage additional funding for mitigation projects that also contribute to community goals for protecting sensitive natural resources. Awareness of natural assets can lead to opportunities for meeting multiple objectives. For instance, protecting wetlands areas protects sensitive habitat as well as reducing the force of and storing floodwaters.

The geographic extent of Placer County spans from the Sacramento Valley to the crest of the Sierra Nevada Range eastward to the Nevada state line. The County in its entirety incorporates four physiographic regions, 14 watersheds, numerous biotic regimes, and approximately 89 rare plant and animal species listed as threatened, endangered, or potential candidates for protection under the Endangered Species Act.

Sacramento Valley Plains Region

Roughly the western one third of Placer County is located in the eastern portion of the Sacramento Valley. Much of this region has been impacted by or converted to urban or agricultural uses. The area is typified by grasslands, oak savannah, and valley foothill riparian vegetation communities. Common plants across the Sacramento Valley Plains region include wild oats, ripgut brome, California poppy, lupines, clover and Valley oak. Common wildlife species include the California ground squirrel, Botta's pocket gopher, mourning dove, horned lark, and western meadowlark. Riparian zones in this region support Freemont's cottonwood, California sycamore, wild rose, California blackberry, blue elderberry, poison oak, and willows.

This region contains wetland types associated with valley floor topography, such as Northern hardpan and Northern volcanic vernal pools, alkali meadow and seep, wet meadow, and fresh emergent wetland.

Lower Foothill Region

The Lower Foothill physiographic region of Placer County is located to the east of the Sacramento Valley Plains at elevations ranging from 100 to 1300 feet. Typical vegetation communities are Blue Oak woodland, Blue Oak-Digger Pine woodland, annual grasslands, Chamise chaparral, and valley foothill riparian. Blue Oak woodlands are located in areas of shallow rocky soils with understory shrubs including poison oak, California coffeeberry and buckbrush. Blue Oak-Digger Pine woodland is similar to Blue Oak woodlands but includes a mix of pine conifer species.

Common wildlife species in the lower foothills region include California quail, band-tailed pigeons, scrub jay, acorn woodpeckers, yellow-billed magpie, wild turkey, California ground squirrel, western gray squirrel, mule deer, and gray fox.

Upper Foothill/Low Mountain Region

The Upper Foothill/Low Mountain physiographic region is located east of the city of Auburn and includes elevations from 1300 to approximately 6000 feet. In general, forest cover is denser relative to the lower foothill region and tree species are more diverse. High variable factors including soil type, topography, slope and aspect, and human influences from grazing, hardwood harvesting, and other land clearing activities are indicators for forest density and composition. Moderate gradient perennial and intermittent streams and rivers support a varied amount of riparian habitat that provide valuable habitat for wildlife.

Montane Hardwood, Montane Hardwood-Conifer, Ponderosa, and Sierran Mixed Conifer are the dominant forest communities. Common tree species in this region includes canyon live oak, tan oak, Pacific madrone, black oak, Douglas fir, white fir, and incense cedar. Common types of shrubs from these forest types are deerbrush, chinquapin, mountain whitethorn, poison oak, and mountain misery.

Mixed chaparral communities composed of shrubs such as ceanothus, Manzanita, scrub oak, California buckeye and wildlife species such as western rattlesnake, California thrasher, California quail, gray fox, and mule deer are also present in this region. Montane riparian forests located in the Upper Foothill/Low Mountain physiographic region are made up of white alder, aspen, black cottonwood, dogwood, willows, and wild azalea.

High Sierra Region

The High Sierra physiographic region represents the highest elevations of Placer County. The region supports wildlife including Pacific tree frogs California mountain king snake, dark-eyed junco, Steller's jay, mountain chickadee, pygmy nuthatch, golden mantled ground squirrel, Allen's chipmunk, Douglas squirrel, mule deer, black bear and mountain lions. Forest types include aspen, white fir, lodgepole pine, red fir, subalpine conifer, Jeffrey pine and eastside pine. The harsh environment that accompanies the highest elevations of the Sierra crest (9,000-11,000 feet) results in somewhat lower overall plant and wildlife diversity and lower incidence and volume of understory shrubs.

East of the Sierra crest, the drier climate regime supports Ponderosa pine, big sagebrush, rabbitbrush and bitterbrush, and High Sierra/Great Basin transition species. The High Sierra physiographic region is classified as major land resource area 22 under the USDA Soil Conservation Service description of land resource areas. Rivers and streams are at a higher gradient than their foothill or valley floor reaches and support a montane riparian habitat that, like the others, provides valuable habitat for resident and migratory wildlife.

Each physiographic region hosts specific habitats that together support a wide variety of vegetation and wildlife (see Table 4.24), and each region has different susceptibilities to hazards such as wildfire, flood, and drought. Placer County recognizes the importance of protecting, preserving, conserving, and restoring this biodiversity.

Table 4.24. Placer County Habitat Types by Physiographic Region

Sacramento Valley Plains Region	Lower Foothill Region	Upper Foothill/Lower Mountain Region	High Sierra Region
<ul style="list-style-type: none"> • Urban, Agricultural and Rangeland • Annual Grasslands • Grassland (with Oak Woodland) • Valley-Foothill Riparian/Riverine • Valley Oak Woodland • Northern Hardpan and Northern Volcanic Vernal Pools • Fresh Emergent Wetland • Alkali Meadow and Seep • Wet Meadow 	<ul style="list-style-type: none"> • Urban, Agricultural and Rangeland • Annual Grasslands • Grassland (with Oak Woodland) • Valley-Foothill Riparian/Riverine • Blue Oak Woodland • Blue Oak-Digger Pine Woodland • Chamise Chaparral • Fresh Emergent Wetland • Wet Meadow 	<ul style="list-style-type: none"> • Montane Hardwood • Montane Hardwood-Conifer • Ponderosa • Sierran Mixed Conifer • Valley-Foothill Riparian/Riverine • Fresh Emergent Wetland • Mixed Chaparral • Blue Oak Woodland • Blue Oak-Digger Pine Woodland • Fresh Emergent Wetland • Wet Meadow 	<ul style="list-style-type: none"> • Montane Chaparral • Montane Hardwood-Conifer • Montane Riparian Forest • Sierran Mixed Conifer • Ponderosa Pine • Jeffrey Pine • White/Red Fir • Lodgepole Pine • Sub-alpine Conifer • Alpine Dwarf Scrub • Bitterbrush • Juniper • Fresh Emergent Wetland • Wet Meadow

Source: Placer County General Plan Background Report

Special Status Species

To further understand natural resources that may be particularly vulnerable to a hazard event, as well as those that need consideration when implementing mitigation activities, it is important to identify at-risk species (i.e., endangered species) in the planning area. An endangered species is any species of fish, plant life, or wildlife that is in danger of extinction throughout all or most of its range. A threatened species is a species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. Both endangered and threatened species are protected by law and any future hazard mitigation projects are subject to these laws. Candidate species are plants and animals that have been proposed as endangered or threatened but are not currently listed.

Information from the U.S. Fish and Wildlife Service and the California Natural Diversity Data Base, a program that inventories the status and locations of rare plants and animals in California, was combined to create an inventory of special status species in Placer County. Table 4.25 lists national and state endangered, threatened, rare, and candidate species in Placer County by species type.

Table 4.25 Endangered, Threatened, and Candidate Species in Placer County

Common Name	Scientific Name	Federal Status	California Status
Amphibians			
California Red-Legged Frog	<i>Rana aurora draytonii</i>	Threatened	None
California Tiger Salamander*	<i>Ambystoma californiense</i>	Threatened	None

Common Name	Scientific Name	Federal Status	California Status
Sierra Nevada Yellow-Legged Frog	<i>Rana muscosa</i>	Candidate	None
Birds			
Bald Eagle	<i>Haliaeetus leucocephalus</i>	Delisted	Endangered
Swainson's Hawk	<i>Buteo swainsoni</i>	None	Threatened
California Black Rail	<i>Laterallus jamaicensis coturniculus</i>	None	Threatened
Willow Flycatcher	<i>Empidonax traillii</i>	None	Endangered
Fish			
Central Valley Steelhead*	<i>Oncorhynchus mykiss</i>	Threatened	None
Lahontan Cutthroat Trout	<i>Oncorhynchus (=Salmo) clarkii henshawi</i>	Threatened	None
Central Valley Spring-Run Chinook Salmon	<i>Oncorhynchus tshawytscha</i>	Threatened	None
Winter Run Chinook Salmon, Sacramento River	<i>Oncorhynchus tshawytscha</i>	Endangered	Unknown
Invertebrates			
Valley Elderberry Longhorn Beetle	<i>Desmocerus californicus dimorphus</i>	Threatened	None
Vernal Pool Fairy Shrimp*	<i>Branchinecta lynchi</i>	Threatened	None
Vernal Pool Tadpole Shrimp	<i>Lepidurus packardii</i>	Endangered	None
Mammals			
Fisher	<i>Martes pennanti</i>	Candidate	
California Wolverine	<i>Gulo gulo</i>	None	Threatened
Plants			
Tahoe Yellow-Cress	<i>Rorippa subumbellata</i>	Candidate	Endangered
Boggs Lake Hedge-Hyssop	<i>Gratiola heterosepala</i>	None	Endangered

Sources: U.S. Fish and Wildlife Service Sacramento Office, www.fws.gov/sacramento/; California Natural Diversity Data Base, www.dfg.ca.gov/biogeodata/cnddb/

*According to the U.S. Fish and Wildlife Service, critical habitat is designated for this species

Table 4.26 identifies animals native to Placer County that are listed by the California Department of Fish and Game (DFG) as Species of Concern. The basis for the Species of Concern designation is documented threats to the long term viability of animals due to habitat loss, environmental hazards, invasive species encroachment, and/or general population decline.

Table 4.26 California Department of Fish and Game Species of Concern, Placer County

Common Name	Scientific Name
Amphibians	
Western Spadefoot	<i>Spea hammondi</i>
California Red-Legged Frog	<i>Rana draytonii</i>

Foothill Yellow-Legged Frog	<i>Rana boylei</i>
Sierra Nevada Yellow-Legged Frog	<i>Rana sierrae</i>
Birds	
Harlequin Duck	<i>Histrionicus histrionicus</i>
Northern Goshawk	<i>Accipiter gentilis</i>
Burrowing Owl	<i>Athene cunicularia</i>
Black Swift	<i>Cypseloides niger</i>
Purple Martin	<i>Progne subis</i>
Yellow Warbler	<i>Dendroica petechia brewsteri</i>
Grasshopper Sparrow	<i>Ammodramus savannarum</i>
Tricolored Blackbird	<i>Agelaius tricolor</i>
Mammals	
Townsend's Big-Eared Bat	<i>Corynorhinus townsendii</i>
Sierra Nevada Snowshoe Hare	<i>Lepus americanus tahoensis</i>
Sierra Nevada Mountain Beaver	<i>Aplodontia rufa californica</i>
Pacific Fisher	<i>Martes pennanti (pacifica) DPS</i>
Reptiles	
Western Pond Turtle	<i>Actinemys marmorata</i>
Northwestern Pond Turtle	<i>Actinemys marmorata marmorata</i>
Coast (California) Horned Lizard	<i>Phrynosoma coronatum (frontale population)</i>

Sources: California Natural Diversity Data Base, www.dfg.ca.gov/biogeodata/cnddb/

Table 4.27 below lists the California Native Plant Society (CNPS) threatened and endangered plant classification for Placer County. This is the plant equivalent to the Species of Concern list and classifies degree of threat or endangerment.

Table 4.27 California Native Plant Society (CNPS), Threatened and Endangered Plant Classification, Placer County

Species Common Name	Scientific Name	CNPS Classification
Elongate Copper Moss	<i>Mielichhoferia elongata</i>	2.2
Big-Scale Balsamroot	<i>Balsamorhiza macrolepis var. macrolepis</i>	1B.2
Starved Daisy	<i>Erigeron miser</i>	1B.3
Nevada Daisy	<i>Erigeron nevadincola</i>	2.3
Galena Creek Rock-Cress	<i>Arabis rigidissima var. demota</i>	1B.2
Tahoe Yellow Cress	<i>Rorippa subumbellata</i>	1B.1
Dwarf Downingia	<i>Downingia pusilla</i>	2.2
Legenere	<i>Legenere limosa</i>	1B.1
Oval-Leaved Viburnum	<i>Viburnum ellipticum</i>	2.3
Stebbins' Phacelia	<i>Phacelia stebbinsii</i>	1B.2

Species Common Name	Scientific Name	CNPS Classification
Marsh Skullcap	<i>Scutellaria galericulata</i>	2.2
Munro's Desert Mallow	<i>Sphaeralcea munroana</i>	2.2
Brandegee's Clarkia	<i>Clarkia biloba ssp. brandegeae</i>	1B.2
Oregon Fireweed	<i>Epilobium oreganum</i>	1B.2
Donner Pass Buckwheat	<i>Eriogonum umbellatum var. torreyanum</i>	1B.2
Pincushion Navarretia	<i>Navarretia myersii ssp. myersii</i>	1B.1
Saw-Toothed Lewisia	<i>Lewisia serrata</i>	1B.1
Long-Petaled Lewisia	<i>Lewisia longipetala</i>	1B.3
Simple Androsace	<i>Androsace occidentalis var. simplex</i>	2.3
Plumas Ivesia	<i>Ivesia sericoleuca</i>	1B.2
Hispid Bird's-Beak	<i>Cordylanthus mollis ssp. hispidus</i>	1B.1
Boggs Lake Hedge-Hyssop	<i>Gratiola heterosepala</i>	1B.2
Felt-Leaved Violet	<i>Viola tomentosa</i>	4.2
Sanford's Arrowhead	<i>Sagittaria sanfordii</i>	1B.2
Northern Meadow Sedge	<i>Carex praticola</i>	2.2
Sheldon's Sedge	<i>Carex sheldonii</i>	2.2
Ahart's Dwarf Rush	<i>Juncus leiospermus var. ahartii</i>	1B.2
Red Bluff Dwarf Rush	<i>Juncus leiospermus var. leiospermus</i>	1B.1
Jepson's Onion	<i>Allium jepsonii</i>	1B.2
Red Hills Soaproot	<i>Chlorogalum grandiflorum</i>	1B.2
Stinkbells	<i>Fritillaria agrestis</i>	4.2
Butte County Fritillary	<i>Fritillaria eastwoodiae</i>	3.2
American Manna Grass	<i>Glyceria grandis</i>	2.3
Slender-Leaved Pondweed	<i>Potamogeton filiformis</i>	2.2
Scalloped Moonwort	<i>Botrychium crenulatum</i>	2.2
Mingan Moonwort	<i>Botrychium minganense</i>	2.2

CNPS Classification	Description
1A	Plants presumed extinct in California
1B	Plants rare, threatened, or endangered in California and elsewhere
2	Plants rare, threatened, or endangered in California, but more common elsewhere
3	Plants about which we need more information - a review list
4	Plants of limited distribution - a watch list
.1	Seriously endangered in California (over 80 percent of occurrences threatened / high degree and immediacy of threat)

CNPS Classification	Description
.2	Fairly endangered in California (20-80 percent occurrences threatened)
.3	Not very endangered in California (<20 percent of occurrences threatened or no current threats known)

Sources: California Department of Fish and Game, California Natural Diversity Data Base, www.dfg.ca.gov/biogeodata/cnddb/

Notes: The California Native Plant Society currently tracks 2,073 plant species, subspecies, and varieties as rare in California. They are assigned to one of five "lists" in an effort to categorize their degree of rarity and endangerment. Additional rarity, endangerment, and distribution codes are assigned to each taxa. Plants on Lists 1A, 1B, and 2 of the CNPS Inventory consist of plants that may qualify for listing, and the Department recommends they be addressed in CEQA projects (CEQA Guidelines Section 15380). However, a plant need not be in the Inventory to be considered a rare, threatened, or endangered species under CEQA. In addition, the California Department of Fish and Game recommends, and local governments may require, protection of plants which are regionally significant, such as locally rare species, disjunct populations of more common plants, or plants on the CNPS Lists 3 and 4.

Rare Natural Plant Communities

The Placer County General Plan Draft Background Report identifies five rare natural plant communities in the planning area:

- Big Tree Forest
- Alkali Meadow
- Alkali Seep
- Northern Hardpan Vernal Pool
- Northern Volcanic Mud Flow Vernal Pool

Significant Natural Areas of Placer County

From information provided in the Placer County General Plan Background Report, Table 4.28 below outlines the location, elements, and rationale for listing of significant natural areas in Placer County.

Table 4.28 Description of Significant Natural Areas in Placer County

Location	Elements	Rationale
Lower Miner's Ravine	Fall-run chinook salmon stream	Best example
Roseville eastern vernal pools	Northern volcanic mudflow vernal pools, wetlands	
Roseville northern vernal pools	Roseville northern vernal pools, northern	Extremely rare
Pole Creek	Lahontan cutthroat trout stream	Extremely rare
Upper Secret Ravine	Fall-run chinook salmon stream	Best example
Long Canyon	Saw toothed lewisia, Stebbins' phacelia	
Upper Pleasant Grove Creek	Alkali meadow, alkali seep, hispid birds	
Martis Creek	Lahontan cutthroat trout stream	Best example
Blackwood Creek	Tahoe yellow cress	Extremely rare
Ward Creek	Tahoe yellow cress	Extremely rare

Source: Placer County General Plan Background Report

Wetlands

Wetlands are habitats in which soils are intermittently or permanently saturated or inundated. Wetland habitats vary from rivers to seasonal ponding of alkaline flats and include swamps, bogs, marshes, vernal pools, and riparian woodlands. Wetlands are considered to be waters of the United States and are subject to the jurisdiction of the U.S. Army Corps of Engineers as well as the California Department of Fish and Game (CDF&G). Where the waters provide habitat for federally endangered species, the U.S. Fish and Wildlife Service may also have authority.

Wetlands are a valuable natural resource for communities providing beneficial impact to water quality, wildlife protection, recreation, and education, and play an important role in hazard mitigation. Wetlands provide drought relief in water-scarce areas where the relationship between water storage and streamflow regulation is vital, and reduce flood peaks and slowly release floodwaters to downstream areas. When surface runoff is dampened, the erosive powers of the water are greatly diminished. Furthermore, the reduction in the velocity of inflowing water as it passes through a wetland helps remove sediment being transported by the water.

Notable categories of wetlands found in Placer County include vernal pools, alkali meadows and seeps, wet meadows, fresh emergent wetlands, and portions of montane riparian and mixed riparian forests. Northern volcanic mudflow vernal pools and northern hardpan vernal pools occur in annual grasslands in the vicinity of Lincoln, Loomis, Rocklin, and Roseville. The Placer County General Plan Background Report notes that critical vernal pool habitat has been eliminated due to urban expansion in these areas and that alkali meadow habitat is threatened by urban expansion north of Roseville. Table 4.29 outlines species dependent on wetland habitat by type.

Table 4.29 Wetland Dependent Species, Placer County

Wetland Type	Plants	Animals
Vernal Pools		
	Popcorn Flowers	Western Spadefoot Toads
	Annual Hairgrass	Tiger Salamander
	Rayless Goldfields	Western Toads
	Purple-Horned Downingia	Mallard Ducks
	Marigold Navarettia	Cinnamon Teal
Alkali Meadow And Seep		
	Rushes	
	Saltgrass	
	Hispid Bird's Beak	
Wet Meadow		
	Sedges	Red-Wing Blackbird
	Rushes	Yellow-Wing Blackbird
	Willows	Pacific Tree Frog

Wetland Type	Plants	Animals
	Spikerush	Long-Toed Salamanders
	Redtop	Racers
		Western Aquatic Garter Snakes
Fresh Emergent Wetland		
	Cattails	Misc. Waterfowl And Shorebirds
	Tules	
	Rushes	
	Sedges	

Source: Placer County General Plan Background Report

Growth and Development Trends

As part of the planning process, the HMPC looked at changes in growth and development, both past and future, and examined these changes in the context of hazard-prone areas, and how the changes in growth and development affect loss estimates and vulnerability. Information from the Placer County General Plan Housing Element, the draft 2008 Placer County General Plan Housing Element, and the California Department of Finance form the basis of this discussion.

More specific information on growth and development for each participating jurisdiction can be found in the jurisdictional annexes.

Current Status and Past Development

The estimated population of Placer County for January 1, 2008 was 333,401, representing nearly a six-fold increase from just under 57,000 people in 1960. County population increased 12.4 percent from 2004-2008 at a 4.49 percent average annual growth rate (AAGR). Population increased at a slower rate of 2.1 percent from January 1, 2007 to January 1, 2008. Tables 4.30-4.31 illustrate the pace of population growth in Placer County for the County overall dating back to 1960 along with more recent population trends for each jurisdiction.

Table 4.30. Placer County Population Growth 1960-2007

Period	1960	1970	1980	1990	2000	2007
Total	56,998	77,632	117,247	172,796	248,399	326,503
Change		20,634	39,615	55,549	75,603	78,104
Percent Change from Previous Period		36.2%	51.0%	47.4%	43.8%	31.4%
Average Annual Growth Rate (AAGR, from previous period)		3.62%	5.10%	4.74%	4.38%	4.49%

Sources: Social Science Data Analysis Network (Census 2000 data), www.census.gov; California Department of Finance, www.dof.ca.gov/Research/

Table 4.31 Population Growth for Jurisdictions in Placer County, 2004-2008

City	2004	2005	2006	2007	2008	Increase	AAGR 2004-	Increase
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						2004-2008	2008	2007-2008
Auburn	12,826	12,934	13,026	13,194	13,273	3.5%	0.9%	0.6%
Colfax	1,806	1,834	1,832	1,849	1,855	2.7%	0.7%	0.3%
Lincoln	23,410	27,323	33,716	37,642	39,758	69.8%	17.5%	5.6%
Loomis	6,323	6,317	6,506	6,570	6,624	4.8%	1.2%	0.8%
Rocklin	49,667	50,829	51,110	52,270	53,843	8.4%	2.1%	3.0%
Roseville	98,399	102,867	105,049	106,925	109,154	10.9%	2.7%	2.1%
Unincorporated	104,126	105,381	106,463	108,053	108,894	4.6%	1.1%	0.8%
Incorporated	192,431	202,104	211,239	218,450	224,507	16.7%	4.2%	2.8%
County Total	296,557	307,485	317,702	326,503	333,401	12.4%	3.1%	2.1%

Source: State of California, Department of Finance, E-5 Population and Housing Estimates for Cities, Counties and the State, 2001-2008, with 2000 Benchmark. Sacramento, California, May 2008.

Notes: Population reports and estimates are for January 1 of each year. 2008 population is estimated.

Similar to population trends, growth in housing units also slowed somewhat from January 1, 2007-January 1, 2008. In recent years, housing construction has followed a pace that was slightly ahead of population growth. Among incorporated cities, housing unit density is highest in Roseville and Rocklin and lowest in Loomis and Colfax. Details regarding growth in housing units and housing unit density are represented in Tables 4.32 and 4.33 below.

Table 4.32. Growth in Housing Units for Jurisdictions in Placer County, 2004-2008

Jurisdiction	2004	2005	2006	2007	2008	Growth 2004-2008	AAGR 2004-2008	Growth 2007- 2008
Auburn	5,732	5,814	5,898	5,971	6,004	4.7%	1.2%	0.6%
Colfax	784	801	806	811	816	4.1%	1.0%	0.6%
Lincoln	9,964	11,880	14,807	16,632	17,514	75.8%	18.9%	5.3%
Loomis	2,342	2,353	2,441	2,452	2,460	5.0%	1.3%	0.3%
Rocklin	19,175	19,679	19,924	20,366	21,036	9.7%	2.4%	3.3%
Roseville	40,136	42,219	43,433	44,187	45,230	12.7%	3.2%	2.4%
Unincorporated	51,178	52,100	53,021	53,788	54,348	6.2%	1.5%	1.0%
Incorporated	78,133	82,746	87,309	90,419	93,060	19.1%	4.8%	2.9%
County Total	129,311	134,846	140,330	144,207	147,408	14.0%	3.5%	2.2%

Source: State of California, Department of Finance, E-5 Population and Housing Estimates for Cities, Counties and the State, 2001-2008, with 2000 Benchmark. Sacramento, California, May 2008.

Note: Population reports and estimates are for January 1 of each year. 2008 population is estimated.

Table 4.33. Population and Housing Unit Density for Jurisdictions in Placer County, 2000-2008

Jurisdiction	Area (square miles)	Population Density 2000	Housing Unit Density 2000	Population Density 2008	Housing Unit Density 2008
Auburn	7.4	1,684.1	737.4	1,793.6	811.4
Colfax	1.3	1,169.2	497.7	1,426.9	627.7
Lincoln	18.3	612.3	226.6	2,172.6	957.0
Loomis	7.3	857.5	311.4	907.4	337.0
Rocklin	16.2	2,242.6	890.2	3,323.6	1,298.5
Roseville	30.5	2,620.4	1,046.7	3,578.8	1,483.0
Unincorporated	1,323.0	76.1	36.6	82.3	41.1
Incorporated	81.0	1,843.4	726.8	2,771.7	1,148.9
County Total	1,404.0	176.9	76.4	237.5	105.0

Source: US Census; State of California, Department of Finance, E-5 Population and Housing Estimates for Cities, Counties and the State, 2001-2008, with 2000 Benchmark. Sacramento, California, May 2008.

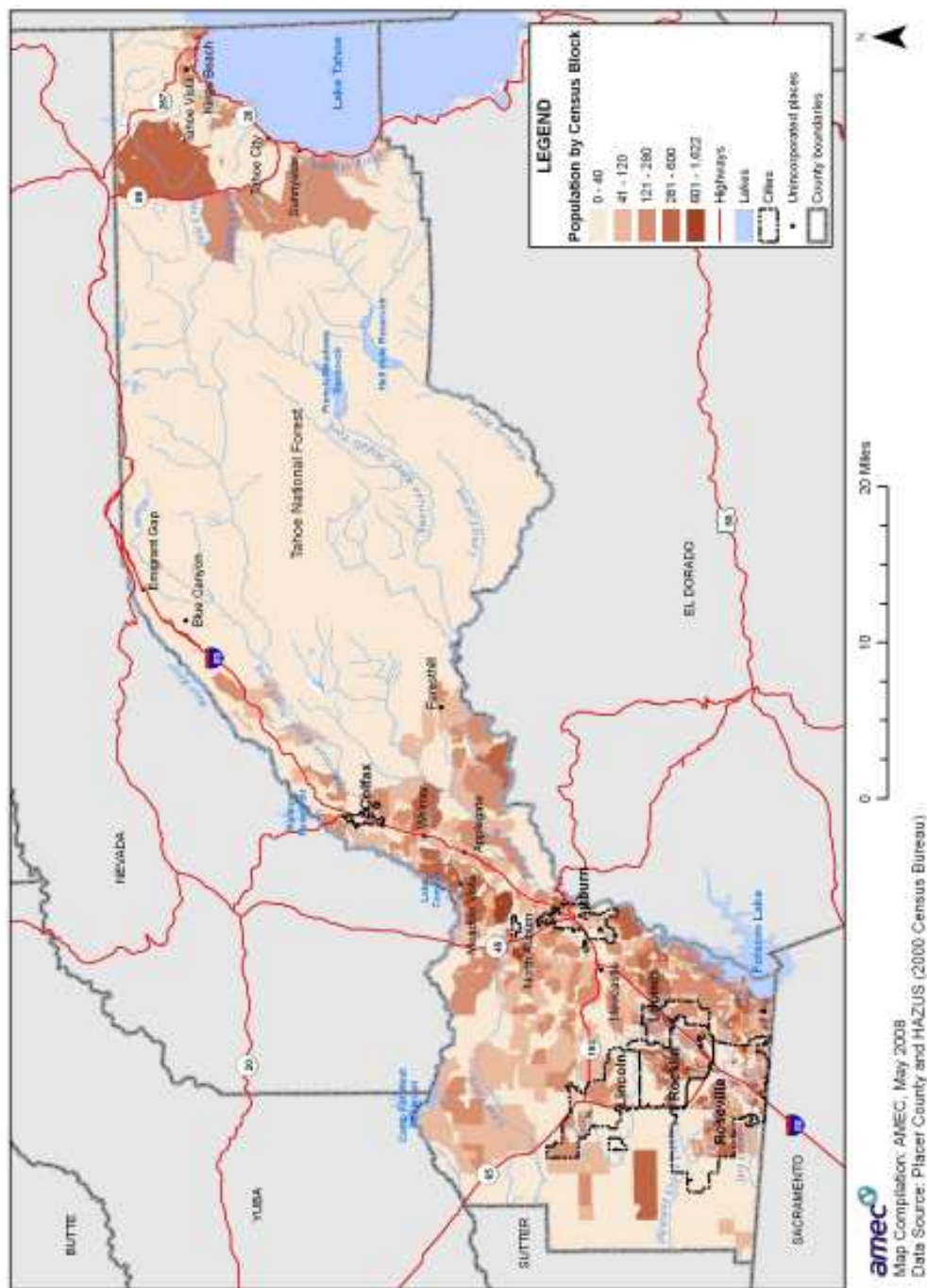
Over two-thirds of the overall growth in housing units from 2004-2008 occurred in the cities of Lincoln (41.7 percent of the County total) and Roseville (28.1 percent of the County total). For this same period there was also significant growth in housing in unincorporated sections of Placer County (17.5 percent of the County total). Table 4.34 below outlines housing unit increases by jurisdiction for the period 2004-2008 and Figure 4.36 on the following page illustrates county population by census block based on 2000 census data.

Table 4.34. Housing Unit Increase by Jurisdiction, Placer County 2004-2008

Jurisdiction	Housing Unit Net Increase 2004-2008	Percent of Overall County Increase
Auburn	272	1.5%
Colfax	32	0.2%
Lincoln	7,550	41.7%
Loomis	118	0.7%
Rocklin	1,861	10.3%
Roseville	5,094	28.1%
Unincorporated	3,170	17.5%
County Total	18,097	100.0%

Source: State of California, Department of Finance, E-5 Population and Housing Estimates for Cities, Counties and the State, 2001-2008, with 2000 Benchmark. Sacramento, California, May 2008.

Figure 4.36. Placer County Population by Census Block



Current Status and Past Development Summary

- The city of Lincoln had the highest population growth in the county between 2004 and 2008 (16,348 people, 69.8 percent increase). Lincoln's growth during the period constituted nearly one half of the overall population increase for the county.
- 108,894 individuals, or 32.7 percent, of Placer County's residents live in the unincorporated portion of the County.
- 82.5 percent of the housing unit growth and 87.1 percent of the population growth occurred in incorporated cities of Placer County.
- Population and housing unit growth for 2007-2008 was lower than the previous four-year average for every jurisdiction except Rocklin.
- Growth in housing units over each of the periods measured tracked slightly ahead of population growth, indicating a trend toward fewer persons per household and/or an oversupply of housing.
- Population and housing density increased in all jurisdictions, incorporated and unincorporated, for the period 2004-2008.

Future Development

As indicated in the previous section, Placer County has been steadily growing over the last four decades, albeit at a gradually slowing rate for the period 2004-2008. Long term forecasts by the California Department of Finance project population growth in Placer County continuing through the middle of the century, effectively tripling the 2000 county population by the year 2050. Table 4.35 shows the population projections for the County as a whole through 2050.

Table 4.35. Population Projections for Placer County, 2000-2050

	2000	2010	2020	2030	2040	2050
Population	252,223	347,543	428,535	512,509	625,964	751,208
Percent Change	--	37.8%	23.3%	19.6%	22.1%	20.0%
Average Annual Increase (%)	--	3.8%	2.3%	2.0%	2.2%	2.0%
Population Increase Per Decade	--	95,320	80,992	83,974	113,455	125,244
Average Annual Increase (Number)	--	9,532	8,099	8,397	11,346	12,524
Cumulative Population Increase	--	95,320	176,312	260,286	373,741	498,985

Source: California Department of Finance, www.dof.ca.gov/Research/

Housing Needs Forecasts

To forecast future housing needs for the county overall, population projections for the period 2008-2020 were divided by average household size to generate an estimate for the number of additional housing units needed to accommodate future growth. To forecast future housing needs by jurisdiction, a similar methodology was used in which overall County population projections for the period 2008-2020 were divided by average household size and then multiplied by each jurisdiction's percentage of total County growth for the period 2004-2008. It should be noted that

estimates for future housing needs assume vacancy rates from 2000 and 2006 Census data remain constant. Table 4.36 below represents intermediate term housing needs forecasts for each incorporated city and the County overall based on the previously described methodology.

Table 4.36. Intermediate Term Housing Needs Forecasts by Jurisdiction, Placer County

	Auburn	Colfax	Lincoln	Loomis	Rocklin	Roseville	Unincorporated	County Total
Average Household Size 2000/2006*	2.31	2.43	2.86	2.82	2.74	2.57	2.63	2.63
Population 2008	13,273	1,855	39,758	6,624	53,843	109,154	108,894	333,401
Projected Population 2010	13,486	1,880	45,658	6,716	55,297	113,135	111,371	347,543
Projected Net Population Increase 2008-2010	213	25	5,900	92	1,454	3,981	2,477	14,142
Additional Housing Units Needed by 2010	92	10	2,063	33	531	1,549	942	5,377
Projected Population 2020	14,703	2,023	79,448	7,244	63,626	135,933	125,558	428,535
Projected Net Population Increase 2010-2020	1,217	143	33,790	528	8,329	22,798	14,187	80,992
Additional Housing Units Needed by 2020	527	59	11,815	187	3,040	8,871	5,394	30,795

Source: US Census; California Department of Finance, www.dof.ca.gov/Research/

Notes: *Average Household Size for Roseville and Placer County from 2006 US Census information. Average Household Size for all other cities are from the 2000 Census. Population projections for individual cities are extrapolated from each city's proportion of overall county housing unit growth for 2004-2008, multiplied by Average Household Size.

Future Development Summary

- According to the projections in Table 4.33, all areas of the County will continue to grow, but the pace of growth will decrease over time, through 2050.
- Total additional housing units needed for Placer County by 2010 is estimated at 5,377 based on population projections from the California Department of Finance, and assuming that vacancy rates remain constant.
- Total additional housing units needed for Placer County by 2020 is estimated at 30,795 based on population projections from the California Department of Finance and assuming that vacancy rates remain constant.
- The percentage of total County population living in incorporated cities is projected to increase from 68.4 percent in 2008 to 71.7 in 2020.

Land Use/Zoning

Future land use and growth management in Placer County aim to concentrate future development into and toward existing communities through various policies relating to zoning and minimum

development standards and requirements. While the General Plan for the County does not include an Urban Limit Line (ULL, or boundary beyond which the County does not approve urban development), the Placer County General Plan does reference the importance of growth management and limiting urban sprawl. The following quote from Policy 1.M.1 of the Land Use Element summarizes the intent of land use policy in the County, “The County shall concentrate most new growth within existing communities emphasizing infill development, intensified use of existing development, and expanded services, so individual communities become more complete, diverse, and balanced.”

Zoning designations prescribe allowed land uses and minimum lot sizes for the purpose of supporting efficient infrastructure design, conservation of natural resources, and to avoid conflicting uses. Descriptions of allowed uses for each classification are detailed in the Placer County General Plan, Section 1: Land Use. Table 4.37 below outlines minimum parcel size requirements and percentage and acreage of the County zoned by each classification.

Table 4.37. Placer County Land Use by Generalized Land Use Categories, 1994

Zone	Minimum Parcel Size	Acres Zoned	Percent
Agricultural Residential	10,000 sq ft.	45,271	5.23%
Forest Residential	10 acres	63,854	7.37%
Single Family Residential	10,000 sq ft.	20,099	2.32%
Medium Density Multiple Residential	6,000 sq ft.	344	0.04%
High Density Multiple Residential	6,000 sq ft.	634	0.07%
Single Family Residential, Tahoe	10,000 sq ft.	11,204	1.29%
Low Density Residential, Tahoe	10,000 sq ft.	187	0.02%
Multiple Residential, Tahoe	10,000 sq ft.	171	0.02%
Motel District	10,000 sq ft.	446	0.05%
Residential Professional	10,000 sq ft.	175	0.02%
Neighborhood Commercial	5,000 sq ft.	451	0.05%
General Commercial	5,000 sq ft.	828	0.10%
Heavy Commercial	2,000 sq ft.	479	0.06%
Limited Industrial	7,500 sq ft.	280	0.03%
Neighborhood Shopping Center	per CUP	356	0.04%
Highway Service	8,000 sq ft.	422	0.05%
Recreation and Forestry	40,000 sq ft.	3,061	0.35%
Airport	40,000 sq ft.	110	0.01%
Industrial	8,000 sq ft.	1,926	0.22%
Industrial Park	20,000 sq ft.	2,116	0.24%
Industrial Reserve	Specific plan	844	0.10%
Agricultural Exclusive	20 acres	325	0.04%
Farm	200,000 sq ft.	199,298	23.02%
Forestry	5 acres	362,867	41.91%
Timberland Preserve	160 acres	118,409	13.67%

Zone	Minimum Parcel Size	Acres Zoned	Percent
Open Space	200,000 sq ft.	13,810	1.59%
Water Influence	per CUP	17,837	2.06%
Unclassified	6,000 sq ft.	118	0.01%

Source: Placer County General Plan Background Report, 1994

*Due to areas of open water and zoning classification scheme, individual figures do not exactly total 1,503 square miles

Figures 4.37 and 4.38 below illustrate residential development potential for the County.

Figure 4.37 Placer County Potential Urban and Residential Growth

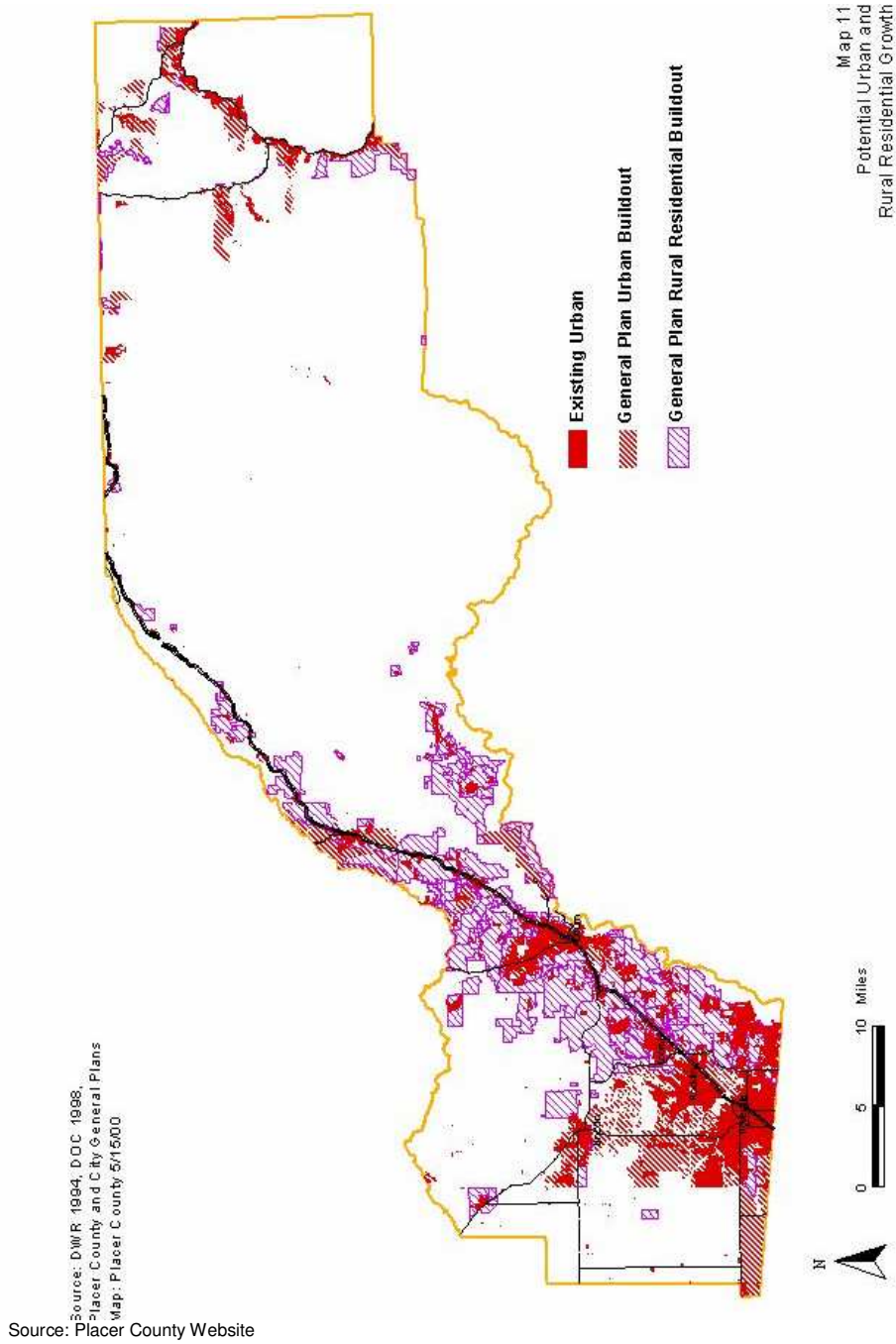
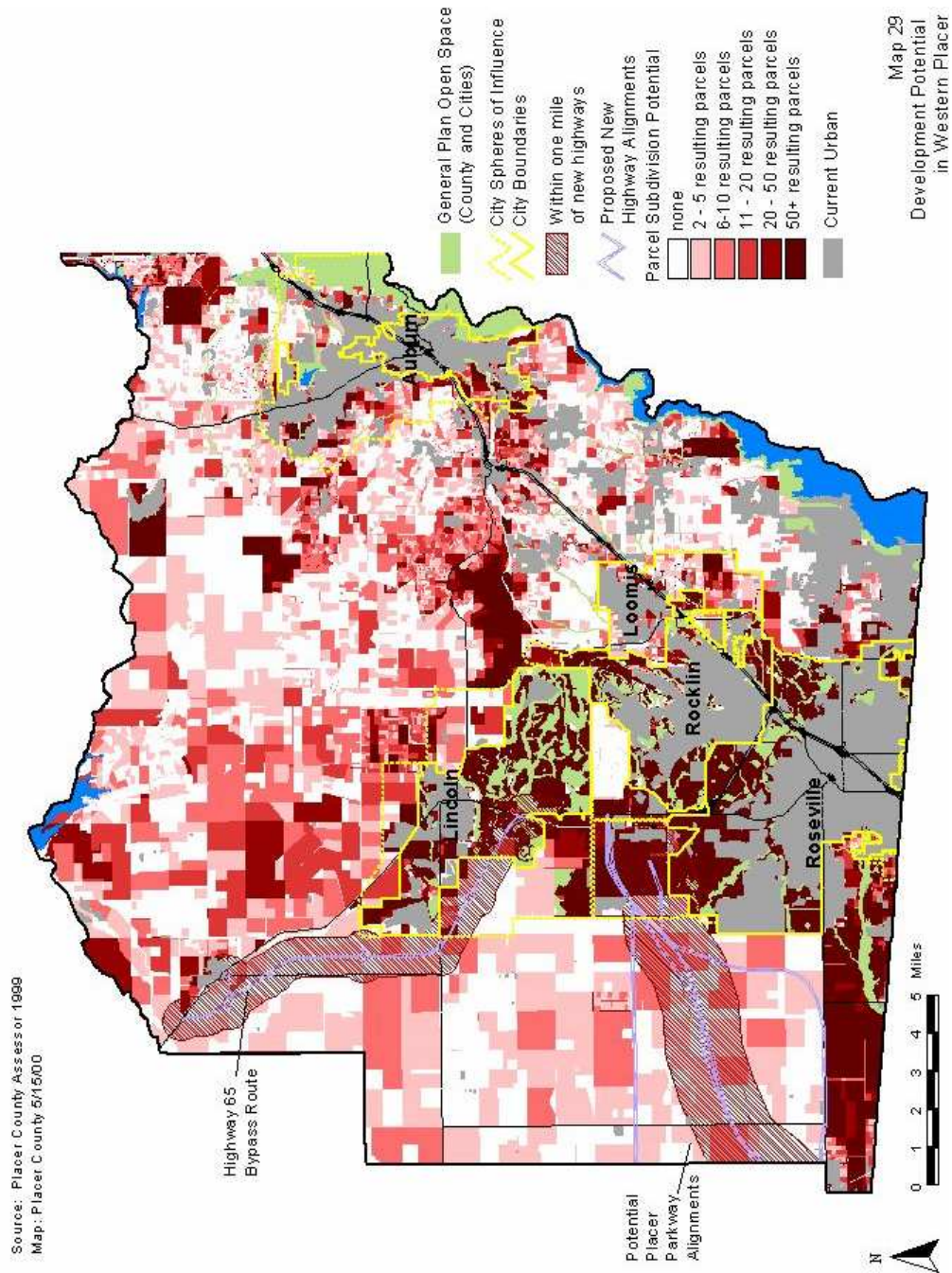


Figure 4.38 Placer County Potential Urban and Residential Growth



Source: Placer County

Are there other maps depicting future development areas-This would be great.

4.3.2 Vulnerability of Placer County to Specific Hazards

The Disaster Mitigation Act regulations require that the HMPC evaluate the risks associated with each of the hazards identified in the planning process. This section summarizes the possible impacts and quantifies, where data permits, the County's vulnerability to each of the hazards identified as a priority hazard in Section 4.2.21 Natural Hazards Summary. Where specific hazards vary across the County, additional information can be found in the jurisdictional annexes. The hazards evaluated further as part of this vulnerability assessment include:

- Agricultural Hazard
- Dam Failure
- Drought
- Earthquake
- Flood
- Landslides
- Seiche
- Severe Weather
 - Extreme Temperatures
 - Heavy Rain/Thunderstorm/Hail/Lightning/Wind
 - Snow
- Wildfire

An estimate of the vulnerability of the County to each identified hazard, in addition to the estimate of risk of future occurrence, is provided in each of the hazard-specific sections that follow. Vulnerability is measured in general, qualitative terms and is a summary of the potential impact based on past occurrences, spatial extent, and damage and casualty potential. It is categorized into the following classifications:

- **Extremely Low**—The occurrence and potential cost of damage to life and property is very minimal to nonexistent.
- **Low**—Minimal potential impact. The occurrence and potential cost of damage to life and property is minimal.
- **Medium**—Moderate potential impact. This ranking carries a moderate threat level to the general population and/or built environment. Here the potential damage is more isolated and less costly than a more widespread disaster.
- **High**—Widespread potential impact. This ranking carries a high threat to the general population and/or built environment. The potential for damage is widespread. Hazards in this category may have occurred in the past.
- **Extremely High**—Very widespread with catastrophic impact.

Vulnerability can be quantified in those instances where there is a known, identified hazard area, such as a mapped floodplain. In these instances, the numbers and types of buildings subject to the identified hazard can be counted and their values tabulated. Other information can be collected in regard to the hazard area, such as the location of critical community facilities (e.g., a fire station), historic structures, and valued natural resources (e.g., an identified wetland or endangered species habitat). Together, this information conveys the impact, or vulnerability, of that area to that hazard.

The HMPC identified three hazards in the planning area for which specific geographical hazard areas have been defined and for which sufficient data exists to support a vulnerability analysis. These three hazards are flood, wildfire, and earthquake. Because these hazards have discrete hazard risk areas, their risk varies by jurisdiction. For flood and wildfire, the HMPC inventoried the following for each community, to the extent possible, to quantify vulnerability in identified hazard areas:

- General hazard-related impacts, including impacts to life, safety, and health
- Insurance coverage, claims paid, and repetitive losses
- Values at risk (i.e., types, numbers, and value of land and improvements)
- Identification of critical facilities at risk
- Identification of cultural and natural resources at risk
- Overall community impact
- Development trends within the identified hazard area

The HMPC used FEMA's loss estimation software, HAZUS-MH, to analyze the County's vulnerability to earthquakes.

The vulnerability and potential impacts from priority hazards that do not have specific mapped areas nor the data to support additional vulnerability analysis are discussed in more general terms in alphabetical order following the discussion on earthquake.

Hazards with Geographical Limits

Vulnerability to Flood

100-Year Flood:

Likelihood of Future Occurrence—Occasional

Vulnerability—High

<100-Year Flood/Localized Flooding:

Likelihood of Future Occurrence —Highly Likely

Vulnerability—Medium

Flooding is a significant problem in Placer County. Historically, the Placer County planning area has been at risk to flooding primarily during the winter and spring months when river systems in the County swell with heavy rainfall and snowmelt runoff. Normally, storm floodwaters are kept within defined limits by a variety of storm drainage and flood control measures. Occasionally, extended heavy rains result in floodwaters that exceed normal high-water boundaries and cause damage. Flooding has occurred both within the 100-year floodplain and in other localized areas

Historically, much of the growth in the County has occurred adjacent to streams, resulting in significant damages to property, and losses from disruption of community activities when the streams overflow. Additional development in the watersheds of these streams affects both the frequency and duration of damaging floods through an increase in stormwater runoff. Other problems connected with stormwater runoff include erosion, sedimentation, degradation of water quality, losses of environmental resources, and certain health hazards.

Methodology

The unincorporated County and incorporated communities have mapped flood hazard areas. GIS was used to determine the possible impacts of flooding within the County, and where the flood risk varies across the planning area. Once the flood hazard areas were mapped, the next step was to quantify the flood vulnerability by jurisdiction. The following methodology was followed in creating these flood vulnerability maps and determining values at risk to the 100- and 500-year flood events.

FEMA Q3 data provided by Placer County was used as the digital floodplain layer. This dataset was the most comprehensive electronic representation of the 100- and 500-year floodplains for the entire planning area. Table 4.38 summarizes the flood zones included on these maps.

Table 4.38. Placer County Flood Zones

Flood Zone	Definition
Special Flood Hazard Areas (SFHA) Subject to Inundation by 100-Year Flood	
Zone A	No Base Flood Elevations determined
Zone AE	Base Flood Elevations determined
Zone AH	Flood depths of 1-3 feet (usually areas of ponding); Base Flood Elevations determined.
Zone AO	Flood depths of 1-3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
Zone A99	Area to be protected from 1 percent annual chance flood by a federal flood protection system under construction; no Base Flood Elevations determined.
Other Flood Areas	
Zone X (with color coding)	Areas of 0.2 percent annual chance flood (i.e., 500-year flood); areas of 1 percent annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1 percent annual chance flood.
Other Areas	
Zone X (with no shading)	Areas determined to be outside the 0.2 percent annual chance floodplain.

Flood Zone	Definition
Zone D	Areas in which flood hazards are undetermined, but possible.

Source: Flood Insurance Rate Maps, Placer County

Flood data used for City of Auburn is the only exception; that city provided GIS data of parcels that are affected by the 100-year floodplain. The same methodology was used for this analysis; see Annex A for more detailed description of the data and analysis.

The County’s parcel layer was used as the basis for the inventory of developed parcels. In some cases, there are parcels in multiple flood zones. GIS was used to create centroids, or points, to represent the center of each parcel polygon. The layer was then overlaid on the floodplain layer. For the purposes of this analysis, the flood zone in which the centroid was located was assigned as the flood zone for the entire parcel. This model assumed that every parcel with an improved value greater than zero was developed in some way. Only improved parcels and the value of their improvements were analyzed. In order to assess the land use type by flood zone, a land use code table was joined to the parcel layer. The codes were simplified into six categories: Agriculture, Commercial, Industrial, Miscellaneous, Open Space, and Residential.

The parcels were segregated and analyzed for the entire County, unincorporated areas only, and for the following incorporated cities/towns: Auburn, Colfax, Lincoln, Loomis, and Rocklin. The results for the County as a whole and the unincorporated areas are reported in this section. The results for the participating incorporated cities can be found in their respective jurisdictional annexes.

Following this methodology, flood maps were created that illustrate where flooding is most likely to happen in unincorporated Placer County (see Figures 4.3-4.40).

Figure 4.39. Eastern Unincorporated Placer County 100- and 500-Year Floods

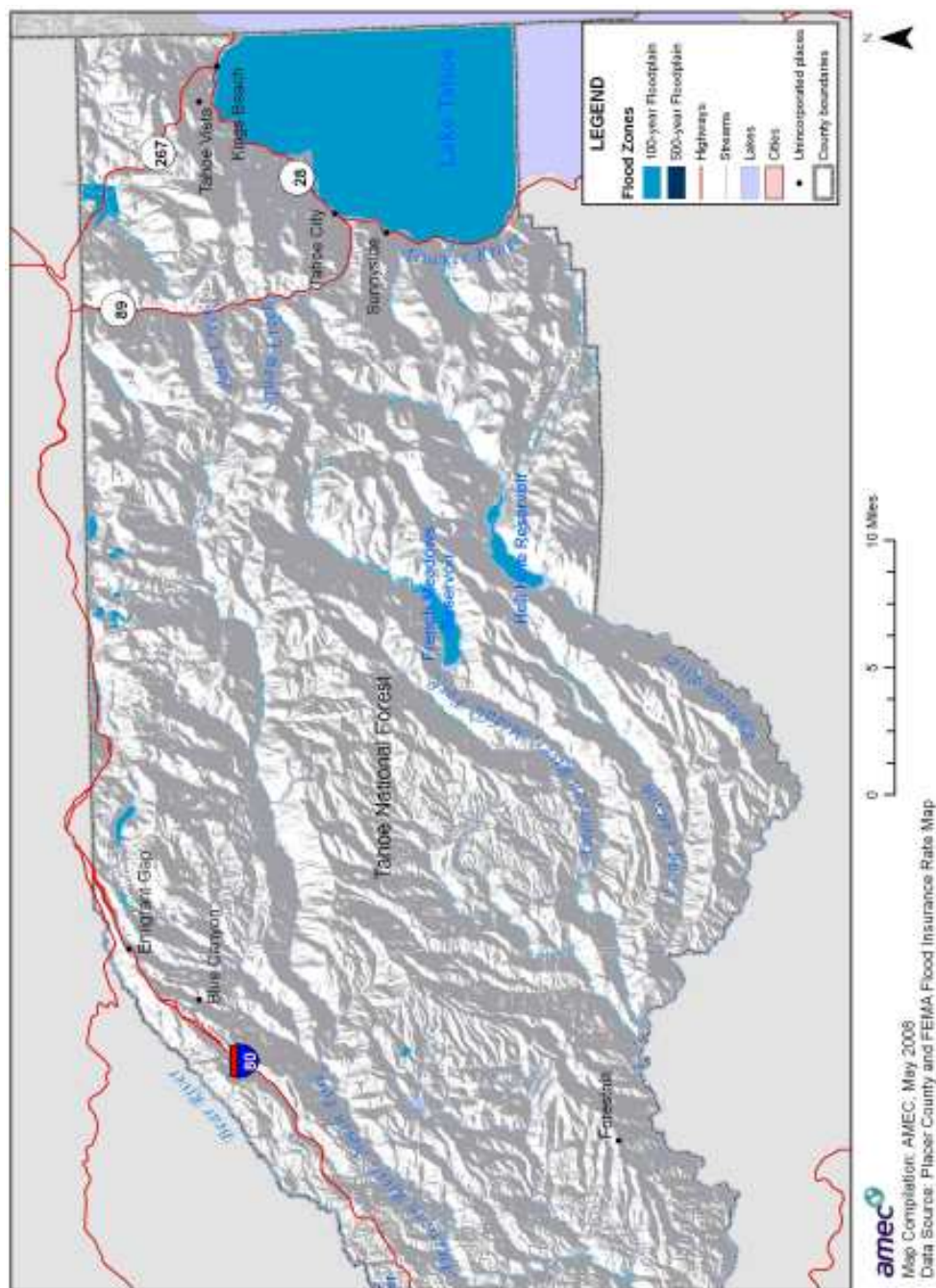
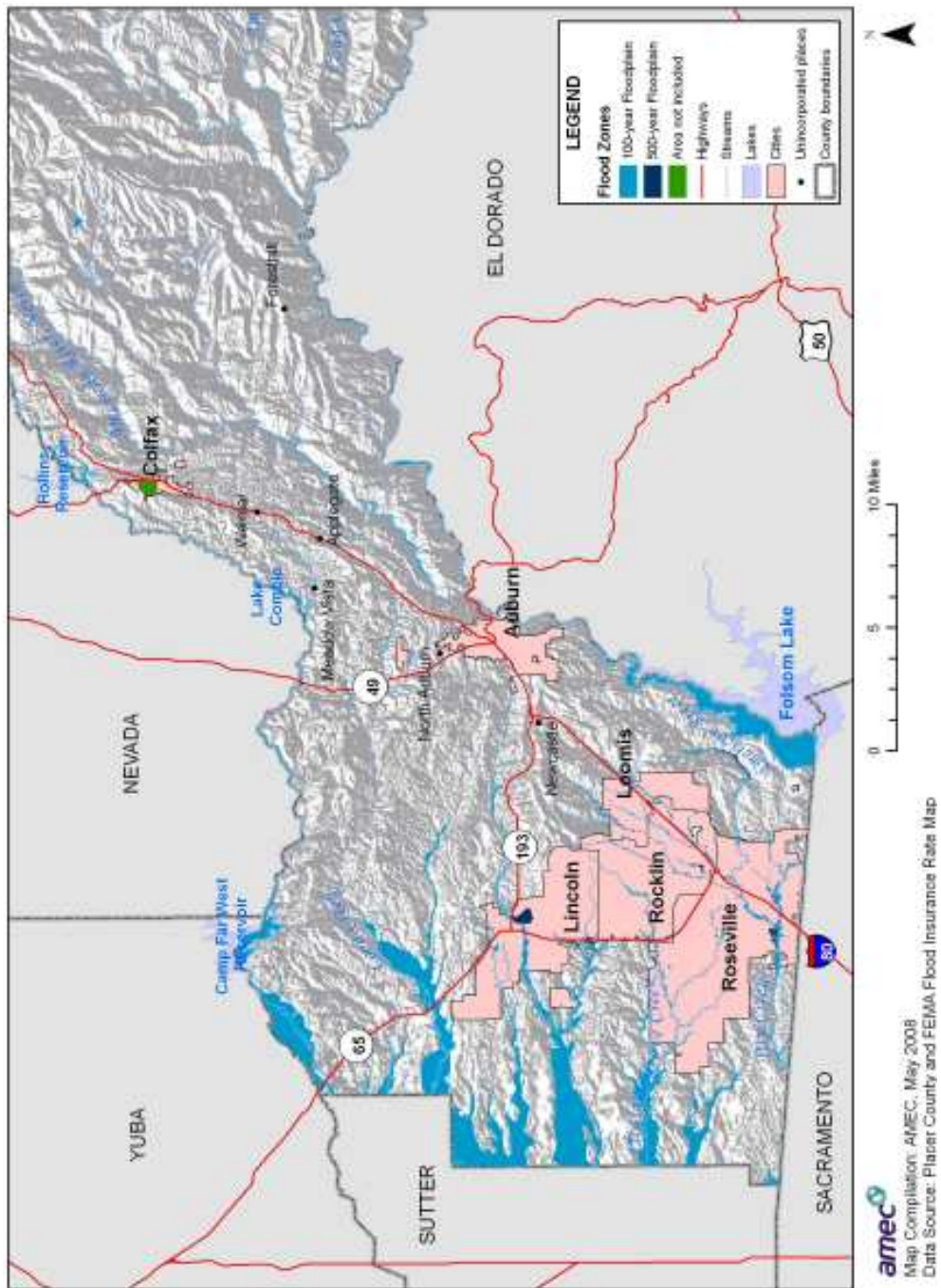


Figure 4.40. Western Unincorporated Placer County 100- and 500-Year Floods



Values at Risk

Tables 4.39-4.43 summarize the values at risk in Placer County's floodplain. The data is presented here in two parts. First it looks at the entire Placer County planning area, and then it focuses in on the unincorporated areas. Similar data is available for the other participating jurisdictions in the jurisdictional annexes. Three tables are used to depict the flood hazard.

- The first table is a detailed analysis that shows the count and improved value of parcels that fall in a floodplain by flood zone and property type.
- The second table summarizes the information in the first table by the 100-year flood, 500-year flood, and total flood (100- and 500-year floods combined).
- The third table shows loss estimates by flood based on guidance from FEMA. Based on this guidance, contents value is estimated at 50 percent of the improved value. Estimated losses assume that a flood is unlikely to cause total destruction. Losses are related to a variety of factors, including flood depth, flood velocity, building type, and construction. Using FEMA's recommendations, average damage is estimated to be 20 percent of the total building value.

While there are several limitations to this model, it does allow for potential loss estimation. It should be noted that the model may include structures in the floodplains that are elevated at or above the level of the base-flood elevation, which will likely mitigate flood damage. Also, it is important to remember that the assessed values are well below the actual market values. Thus, the actual value of assets at risk may be significantly higher than those included herein.

Placer County Planning Area

Tables 4.39-4.42 contain information for the entire Placer County planning area. This includes unincorporated Placer County and five incorporated communities. These tables show the number of parcels and values at risk to the 100-year and greater flood for the entire Placer County planning area. Table 4.42 shows the potential losses.

Table 4.39. Count and Improved Value of Parcels in Floodplain by Zone—Placer County Planning Area-East

Unincorporated County (EAST summary)								
	100-year flood		500-year flood		Zone X		Area Not Included	
Property Type	# of parcels	structure value	# of parcels	structure value	# of parcels	structure value	# of parcels	structure value
<i>Agriculture</i>	10	-	-	-	539	\$1,358,178	-	-
<i>Commercial</i>	55	\$4,704,574	1	\$59,586	956	\$256,529,006	-	-
<i>Industrial</i>	9	\$2,173,945	-	-	75	\$21,426,702	-	-
<i>Miscellaneous</i>	445	\$8,443,182	9	-	5,078	\$42,983,924	8	-
<i>Open Space</i>	25	-	-	-	245	\$136,379,971	-	-
<i>Residential</i>	720	\$142,072,422	8	\$1,441,262	21,655	\$4,888,586,264	1	\$210,000
Total	1,264	\$157,394,123	18	\$1,500,848	28,548	\$5,347,264,045	9	\$210,000

Sources: 2007 Certified Roll Values, Placer County Assessor's Office; Flood Insurance Rate Map Placer County, California, FEMA

Table 4.40. Count and Improved Value of Parcels in Floodplain by Zone—Placer County Planning Area-West

Unincorporated County & Cities (WEST summary)								
	100-year flood		500-year flood		Zone X		Area Not Included	
Property Type	# of parcels	structure value	# of parcels	structure value	# of parcels	structure value	# of parcels	structure value
<i>Agriculture</i>	73	\$1,733,357	-	-	654	\$15,599,726	-	-
<i>Commercial</i>	56	\$41,129,243	7	\$1,927,166	2,522	\$2,101,060,943	69	\$8,879,832
<i>Industrial</i>	25	\$35,522,753	3	\$99,896	776	\$648,786,190	12	\$1,139,065
<i>Miscellaneous</i>	347	\$2,354,000	47	\$23,031	9,083	\$46,850,437	78	\$1,572
<i>Open Space</i>	45	-	12	-	385	\$22,360,360	-	-
<i>Residential</i>	878	\$168,149,703	751	\$214,661,422	70,476	\$16,805,221,240	346	\$36,420,475
Total	1,424	\$248,889,056	820	\$216,711,515	83,896	\$19,639,878,896	505	\$46,440,944

Sources: 2007 Certified Roll Values, Placer County Assessor's Office; Flood Insurance Rate Map Placer County, California, FEMA

Table 4.41. Count and Improved Value of Parcels in Floodplain by Type of Flood—Placer County Planning Area-Summary

Unincorporated County & Cities								
	100-year flood		500-year flood		Zone X		Area Not Included	
Property Type	# of parcels	structure value	# of parcels	structure value	# of parcels	structure value	# of parcels	structure value
<i>Agriculture</i>	83	\$1,733,357	-	-	1,193	\$ 16,957,904	-	-
<i>Commercial</i>	111	\$45,833,817	8	\$1,986,752	3,478	\$2,357,589,949	69	\$ 8,879,832
<i>Industrial</i>	34	\$ 37,696,698	3	\$99,896	851	\$670,212,892	12	\$ 1,139,065
<i>Miscellaneous</i>	793	\$ 10,797,182	21	\$23,031	14,161	\$89,834,361	86	\$1,572
<i>Open Space</i>	70	-	12	-	630	\$ 158,740,331	-	-
<i>Residential</i>	1,598	\$ 219,516,737	759	\$ 216,102,684	92,131	\$ 21,693,807,504	347	\$ 36,630,475
Total	2,689	\$ 315,577,791	803	\$ 218,212,363	112,444	\$ 24,987,142,941	514	\$ 46,650,944

Sources: 2007 Certified Roll Values, Placer County Assessor's Office; Flood Insurance Rate Map Placer County, California, FEMA

Table 4.42. Placer County Flood Loss Estimates—Placer County Planning Area

Flood Event	# of Parcels	Improved Value (\$)	Estimated Contents Value (\$)	Total Value (\$)	Loss Estimate (\$)
100-Year Flood	2,689	535,094,528	267,547,264	802,641,792	160,528,358
500-Year Flood	803	218,212,363	109,106,182	327,318,545	65,463,709
Total Flood*	3,492	753,306,891	376,653,446	1,129,960,337	225,992,067

Sources: 2007 Certified Roll Values, Placer County Assessor's Office; Flood Insurance Rate Map Placer County, California, FEMA

According to the information in Tables 4.39-4.42, the Placer County planning area has 2,689 improved parcels valued at roughly \$803 million in the 100-year floodplain. An additional 803

improved parcels valued at roughly \$327 million fall within the 500-year floodplain for a combined total of over \$1 billion.

Applying the 20 percent damage factor as previously described, there is a 1 percent chance in any given year of a 100-year flood causing over \$160 million in damage in the Placer County planning area and a .2 percent chance in any given year of a 500-year flood causing close to \$226 million in damage (combined damage from both floods).

Looking at the flood risk for the entire Placer County planning area, in general, the majority of the Placer County Planning Area's flood threat is along the western boundary of the County, with the cities of Lincoln and Rocklin at the greatest risk to flooding. This analysis does not take localized flooding into account.

Unincorporated Placer County

Tables 4.43-4.46 contain information for unincorporated Placer County only. Tables 4.43-4.45 show the number of parcels and values at risk to the 100-year and greater flood in the unincorporated areas and Table 4.46 shows the potential losses.

Table 4.43. Count and Improved Value of Parcels in Floodplain by Type of Flood—Unincorporated Placer County-East

Unincorporated County (EAST summary)								
	100-year flood		500-year flood		Zone X		Area Not Included	
Property Type	# of parcels	structure value	# of parcels	structure value	# of parcels	structure value	# of parcels	structure value
<i>Agriculture</i>	10	-	-	-	539	\$1,358,178	-	-
<i>Commercial</i>	55	\$4,704,574	1	\$59,586	956	\$256,529,006	-	-
<i>Industrial</i>	9	\$2,173,945	-	-	75	\$21,426,702	-	-
<i>Miscellaneous</i>	445	\$8,443,182	9	-	5,078	\$42,983,924	8	-
<i>Open Space</i>	25	-	-	-	245	\$136,379,971	-	-
<i>Residential</i>	720	\$142,072,422	8	\$1,441,262	21,655	\$4,888,586,264	1	\$210,000
Total	1,264	\$157,394,123	18	\$1,500,848	28,548	\$5,347,264,045	9	\$210,000

Sources: 2007 Certified Roll Values, Placer County Assessor's Office; Flood Insurance Rate Map Placer County, California, FEMA

Table 4.44. Count and Improved Value of Parcels in Floodplain by Type of Flood—Unincorporated Placer County-West

Unincorporated County (WEST summary)								
	100-year flood		500-year flood		Zone X		Area Not Included	
Property Type	# of parcels	structure value	# of parcels	structure value	# of parcels	structure value	# of parcels	structure value
<i>Agriculture</i>	73	\$1,733,357	-	-	639	\$15,559,726	-	-
<i>Commercial</i>	5	\$5,343,704	-	-	953	\$817,516,665	-	-
<i>Industrial</i>	5	-	1	-	303	\$390,165,580	-	-
<i>Miscellaneous</i>	261	\$2,354,000	12	-	5,903	\$42,546,978	1	-
<i>Open Space</i>	16	-	-	-	139	\$14,956,780	-	-
<i>Residential</i>	248	\$57,399,154	46	\$15,216,628	30,173	\$7,432,768,155	1	\$220,527
Total	608	\$66,830,215	59	\$15,216,628	38,110	\$8,713,463,884	2	\$220,527

Sources: 2007 Certified Roll Values, Placer County Assessor's Office; Flood Insurance Rate Map Placer County, California, FEMA

Table 4.45. Count and Improved Value of Parcels in Floodplain by Type of Flood—Unincorporated Placer County-Summary

Unincorporated County								
	100-year flood		500-year flood		Zone X		Area Not Included	
Property Type	# of Parcels	Structure Value	# of Parcels	Structure Value	# of Parcels	Structure Value	# of Parcels	Structure Value
<i>Agriculture</i>	83	\$1,733,357	-	-	1,176	\$16,957,904	-	-
<i>Commercial</i>	60	\$10,048,278	1	\$59,586	1,909	\$1,074,045,671	-	-
<i>Industrial</i>	14	\$2,173,945	1	\$0	378	\$411,592,282	-	-
<i>Miscellaneous</i>	706	\$10,797,182	21	\$0	10,981	\$85,440,902	9	\$0
<i>Open Space</i>	41	\$0	-	-	384	\$151,336,751	-	-
<i>Residential</i>	968	\$199,471,576	54	\$16,657,890	51,828	\$12,321,354,419	2	\$430,527
Total	1,872	\$224,224,338	77	\$16,717,476	66,658	\$14,060,727,929	11	\$430,527

Sources: 2007 Certified Roll Values, Placer County Assessor's Office; Flood Insurance Rate Map Placer County, California, FEMA

Table 4.46. Placer County Flood Loss Estimates—Unincorporated Placer County

Unincorporated County					
	Total # of Parcels	Structure Value	Estimated contents Value	Total Value	Loss Estimate
100-year flood	1,872	\$224,224,338	\$112,112,169	\$336,336,507	\$67,267,301
500-year flood	77	\$16,717,476	\$8,358,738	\$25,076,214	\$5,015,243
Total flood*	1,949	\$240,941,814	\$120,470,907	\$361,412,721	\$72,282,544

Sources: 2007 Certified Roll Values, Placer County Assessor's Office; Flood Insurance Rate Map Placer County, California, FEMA

According to the information in Tables 4.43-4.46, unincorporated Placer County has 1,872 improved parcels valued at roughly \$336 million in the 100-year floodplain. An additional 77 improved parcels, valued at roughly \$25 million, fall within the 500-year floodplain for a combined total of over \$361 million.

Applying the 20 percent damage factor as previously described, there is a 1 percent chance in any given year of a 100-year flood causing roughly \$67 million in damage in the unincorporated areas of Placer County and a .2 percent chance in any given year of a 500-year flood causing roughly \$72 million in damage (combined damage from both floods).

Insurance Coverage, Claims Paid, and Repetitive Losses

Unincorporated Placer County joined the NFIP on April 18, 1983, and the CRS on October 1, 1991. According to the CRS listing of eligible communities dated May 1, 2008, the County is currently a Class 5, which provides a 25 percent discount on flood insurance for those located within the special flood hazard area (SFHA) and a 10 percent discount for those located in non-SFHA areas.

NFIP insurance data indicates that as of November 30, 2007, there were 569 policies in force in the unincorporated County, resulting in \$146,241,600 of insurance in force. Of these, 544 are for residential properties; 25 are nonresidential. 200 of these are in A zones; 364 policies are for parcels in the B, C, and X zones.

There have been 153 historical claims for flood losses totaling \$3,926,097; 149 of these were for residential properties and 6 were nonresidential. Of these losses, 80 were parcels in A zones and 70 parcels were in the B, C, and X zones. Information was not provided on the other three claims. Of the 153 claims, 126 claims were associated with pre-FIRM structures and 19 with post-FIRM structures. Sixteen of these claims were for substantial damage losses.

There is only one repetitive loss parcel in the unincorporated County with two paid losses totaling \$12,267. There are a total of 20 repetitive loss properties in the Placer County planning area, with 11 having been mitigated based on a June 30, 2007 report. **Please confirm**

Based on this analysis of insurance coverage, unincorporated Placer County has significant assets at risk to the 100-year and greater floods. Of the 1,872 improved parcels within the 100-year floodplain, only 200 (or 10.7 percent) of those parcels maintain flood insurance.

Populations at Risk

Of greatest concern in the event of a flood is the potential for loss of life. Using 2000 population data aggregated by census block data from HAZUS-MH and GIS, an estimate was made of populations within the 100- and 500-year floodplains. To account for parcels that were split by flood boundaries, a proportional division was performed to better reflect population counts in the floodplain. For example, a census block that was split by a floodplain (40 percent in, 60 percent

out) had its population attributes multiplied by .40. Population counts were then sorted by jurisdiction and results are provided in Table 4.47.

Table 4.47. Placer County Planning Area: Population by Flood Event

Jurisdiction	100-Year Flood	500-Year Flood	Area Not Included	Total
Auburn	748	-	-	748
Colfax	-	-	705	705
Lincoln	443	23	-	466
Loomis	255	80	-	335
Rocklin	1,678	521	-	2,199
Unincorporated	1,694	116	-	1,810
Total	4,818	740	705	6,263

Sources: HAZUS-MH MR3 (Census 2000); Flood Insurance Rate Map Placer County, California, FEMA

Cultural and Natural Resources at Risk

The Placer County planning area has significant cultural and natural resources located throughout the County as previously described. Risk analysis of these resources was not possible due to data limitations. However, natural areas within the floodplain often benefit from periodic flooding as a naturally recurring phenomenon. These natural areas often reduce flood impacts by allowing absorption and infiltration of floodwaters.

Critical Facilities at Risk

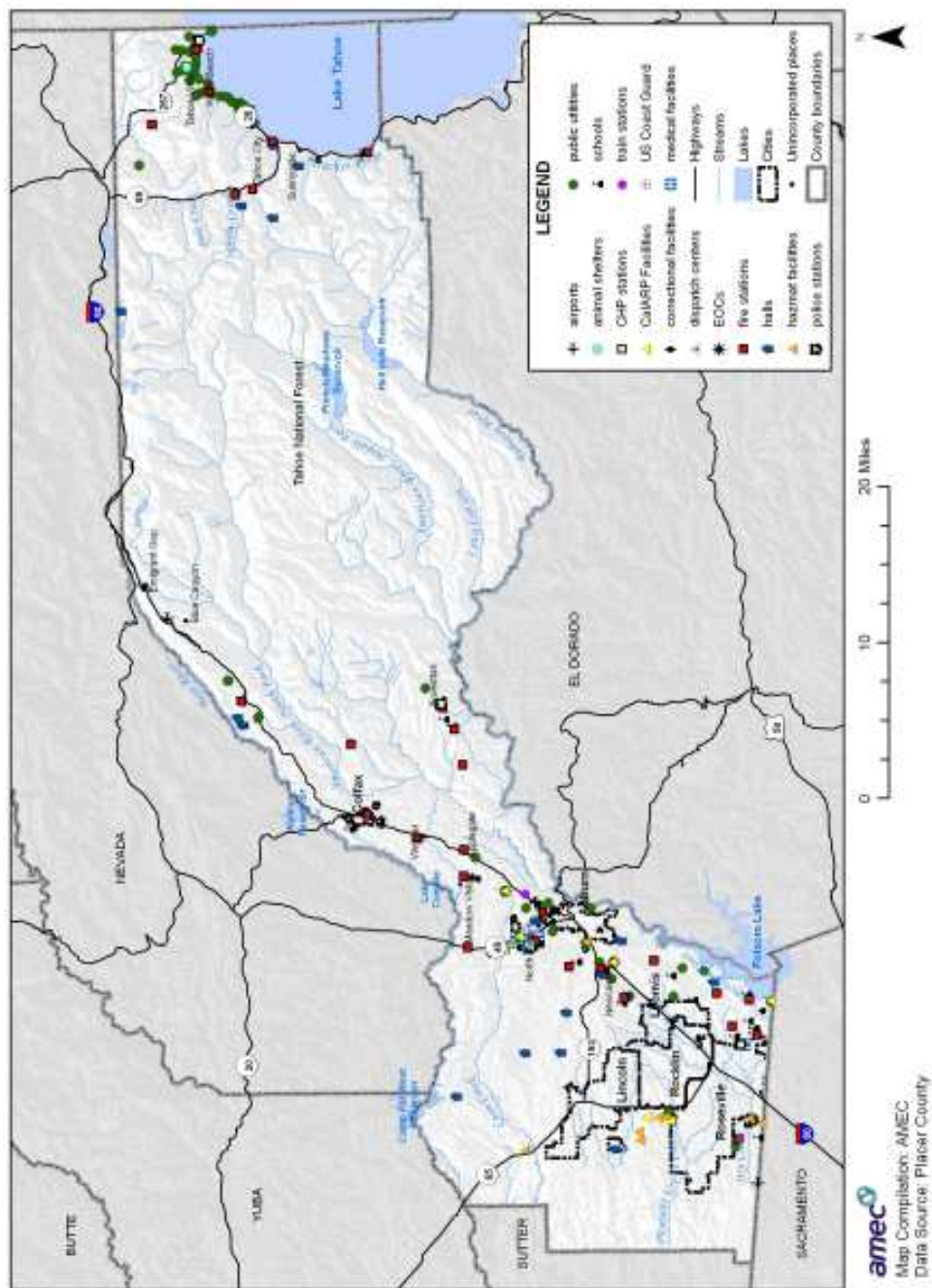
Critical facilities are those community components that are most needed to withstand the impacts of disaster as previously described. An analysis was performed using GIS software to determine critical facilities that are located in Placer County's floodplain. The FIRM flood layer previously discussed was used to identify the 100- and 500-year floodplains. Table 4.48 provides an inventory of these critical facilities in the floodplain for both the Placer County planning area and for unincorporated Placer County. Figure 4.41 illustrates the locations of critical facilities relative to the floodplain in the unincorporated areas of the County. The impact to the community could be great if these critical facilities were damaged or destroyed during a flood event. Similar data is available for the other participating jurisdictions in the jurisdictional annexes.

Table 4.48. Critical Facilities in the 100- and 500-Year Floodplains: Placer County Planning Area

Jurisdiction	Facility Name
Lincoln	
<i>100-year Floodplain</i>	
CalARP Facility	Sierra Pacific Industries

Rocklin	
<i>500-year Floodplain</i>	
Public Utility	South Placer Municipal Utility - Corporation Yard
Unincorporated	
<i>100-year Floodplain</i>	
School	Kings Beach Elementary School
Fire Station	North Tahoe Fire Protection
Hall	Lake Tahoe Labor Temple Association
Public Utility	NTPUD Secline St. Sewer Lift Station
Public Utility	NTPUD Moondunes Sewer Lift Station
Public Utility	NTPUD Carnelian Main Sewer Lift Station
Public Utility	Auburn Tunnel Pump Station
<i>500-year Floodplain</i>	
Hazmat Facility	Dry Creek Regional Wastewater Treatment Plant
Source: Placer County GIS	

Figure 4.41. Unincorporated Placer County 100- and 500-Year Floods: Critical Facilities



Development Trends

The development trend in the Placer County planning area is steady, significant growth. Much of this growth is occurring through expansion of the urban areas, causing a significant increase in peak flow and stormwater runoff. Such growth will consume previously undeveloped acres, and the impacts may overwhelm existing drainage and flood control facilities.

The potential for flooding may increase as stormwater is channeled due to land development. Such changes can create localized flooding problems inside and outside of natural floodplains by altering or confining natural drainage channels. Floodplain modeling and master planning should be based on build out land use to ensure that all new development remains safe from future flooding. While local floodplain management, stormwater management, and water quality regulations and policies address these changes on a site-by-site basis, their cumulative effects can have a negative impact on the floodplain.

Development within the 100-year floodplain is prohibited or discouraged. If allowed, development must meet the requirements of the Placer County Code and Community Plan where area is located. Local floodplain management ordinances require that new construction be built with the lowest floor elevated a minimum of 12 inches above the base flood (100-year) elevation. New development that adheres to the elevation requirements, in addition to other requirements for maintaining elevation certificates and implementing stormwater program elements and erosion or sediment controls for all new development in the floodplain, should help protect new development from 100-year floods.

The amount of growth in this and nearby communities can also strain the limits of the entire water management system, which includes water supply in addition to water control. When flood control structures are overwhelmed, the result is not only severe flooding – significant losses to the water supply system may also occur.

With the exception of the Truckee River Watershed, most notable for the 1997 floods, flooding and drainage issues in eastern Placer County are generally not substantial due to well-defined, deeply incised channels and steep channel slopes with limited potential for significant development. Therefore, the greatest concern is the flood issue in western Placer County. It is western Placer that is also seeing the greatest increase in population and development.

According to the Placer County General Plan, 2004, and various watershed studies, the Dry Creek Watershed (which includes the Town of Loomis and the City of Rocklin) is located in western Placer in an area of rapid urbanization and population growth. The Cross Canal Watershed (which includes the City of Lincoln and portions of the Cities of Auburn, Rocklin, and Roseville) in western Placer, made up of five subwatersheds, varies with respect to existing build out, from areas with almost nonexistent development to larger pockets of fairly well developed areas. The Auburn/Bowman area is a largely rural area located in the Sierra Foothills of Placer.

As previously described in this section, the western portion of Placer (also known as “The Valley”) has seen significant development over the last 14 years. The population alone increased by 60.7 percent in The Valley area from 1990 to 2000. Development is also occurring to meet the increased population demands. Growth projections for the area are significant. Increased stormwater runoff (which is a significant contributor to flooding problems) is a major issue with respect to new development. As a result, without proper mitigation efforts, all three major watersheds/drainage areas – Dry Creek, Cross Canal, and Auburn/Bowman area – are likely subject to increased flooding due to additional development in and around the County.

Overall Community Impact

Floods and their impacts vary by location and severity of any given flood event and will likely only affect certain areas of the County during specific times. Based on the risk assessment, it is evident that floods will continue to have potentially devastating economic impacts to certain areas of the County. However, many of the floods in the County are minor, localized flood events that are more of a nuisance than a disaster. Impacts that are not quantified, but can be anticipated in large future events, include:

- Injury and loss of life;
- Commercial and residential structural damage;
- Disruption of and damage to public infrastructure;
- Health hazards associated with mold and mildew;
- Damage to roads/bridges resulting in loss of mobility;
- Significant economic impact (jobs, sales, tax revenue) to the community;
- Negative impact on commercial and residential property values; and
- Significant disruption to students and teachers as temporary facilities and relocations would likely be needed.

Vulnerability to Wildfire

Likelihood of Future Occurrence—Highly Likely

Vulnerability—Extremely High

Risk and vulnerability to the Placer County planning area from wildfire is of significant concern, with some areas of the planning area being at greater risk than others as described further in this section. High fuel loads in the planning area, along with geographical and topographical features, create the potential for both natural and human-caused fires that can result in loss of life and property. These factors, combined with natural weather conditions common to the area, including periods of drought, high temperatures, low relative humidity, and periodic winds, can result in frequent and sometimes catastrophic fires. Even the relatively flat and more urbanized area of western Placer is not immune from fire. During the May to October fire season, the dry vegetation and hot and sometimes windy weather, combined with continued growth in the WUI areas, results in an increase in the number of ignitions. Any fire, once ignited, has the potential to

quickly become a large, out-of-control fire. As development continues throughout the planning area, especially in these interface areas, the risk and vulnerability to wildfires will likely increase.

The Community Wildfire Protection Plan (CWPP) for the California Portion of the Lake Tahoe Basin, where the fire risk is very high, indicates that the area is highly susceptible to a large, crown-type fire due to historical forest management practices and the nature of existing fuel conditions. The plan estimates that the Basin lower montane forests currently have four times the density of trees and upper montane forests currently have twice the density of trees when compared to forest conditions prior to 1870. In addition, current forest stands exhibit a 70 percent higher disease incidence and a 5 percent greater mortality than remnant old growth stands in the basin. According to this community plan, recent estimates indicate that if a fire escaped initial control, at least 50 percent of the burned area would probably occur as a crown fire, with overstory tree mortality exceeding 50 percent. Further, locations that exhibit pronounced levels of drought-, insect-, and pathogen-related mortality would increase fire line construction times and reduce suppression effectiveness.

Likewise, the CWPP for the west slope of the Sierra Nevada in Placer County estimates that there is now a 63 percent chance of a large fire occurring in any year on the west slope of the Sierra Nevada in Placer County, with an average burn of 3,200 acres. These fires will burn with a substantially higher intensity than before fire suppression practices which began in the 1930s. These higher intensity fires will increase the risk of destroying valuable assets in the Placer County planning area.

Placer County Communities at Risk to Wildfire

For purposes of the National Fire Plan, the California Department of Forestry and Fire Protection (CAL FIRE) generated a list of California communities at risk for wildfire. The intent of this assessment was to evaluate the risk to a given area from fire escaping off federal lands. Three main factors were used to determine the wildfire threat in the wildland-urban interface areas of California: fuel hazards, probability of fire, and areas of suitable housing density that could create wildland urban interface fire protection strategy situations. The preliminary criteria and methodology for evaluating wildfire risk to communities is published in the *Federal Register*, January 4, 2001. As of July 2008, the following communities in the Placer County planning area have been identified by the state as at risk to wildfire:

- | | | |
|-----------------|--------------------|------------------|
| • Alta | • Christian Valley | • Gold Run |
| • Auburn | (Nielsburg) | • Heather Glen - |
| • Baxter | • Colfax | Applegate |
| • Bowman | • Dollar Point | • Homewood |
| • Cape Horn | • Dutch Flat | • Iowa Hill |
| • Carnelian Bay | • Emigrant Gap | • Kings Beach |
| • Casa Loma | • Foresthill | • Lincoln |
| | • Gold Hill | • Loomis |

-
- Magra
 - Meadow Vista
 - Michigan Bluff
 - Newcastle
 - North Auburn
 - Ophir
 - Penryn
 - Rocklin
 - Roseville
 - Secret Town
 - Shady Glen
 - Sunnyside-Tahoe City
 - Tahoe Pines
 - Tahoe Vista
 - Twin Pines – Weimar
 - Virginiatown

Methodology

In 2007, CAL FIRE updated its fire hazard severity zone maps for the State of California. The fire hazard model considers wildland fuels, topography, weather, crown fire potential, and ember production and movement. This model does not consider risk. The end product is the identification of fire hazard severity zones rated moderate, high, or very high. Specifically, “Wildfire hazard zones represent areas of variable size ranging from 20 acres in urbanized areas to at least 200 acres in wildland areas, with relatively homogeneous characteristics regarding expected burn probability and potential fire behavior attributes based on climax fuel conditions over a 30-50 year time horizon.”

Using CAL FIRE’s 2007 fire hazard severity zones, an initial assessment of wildfire risk in the Placer County planning area was made following the methodology detailed below. The results are summarized in the tables and maps that follow.

The wildfire data was acquired from the CAL FIRE Fire and Resource Assessment Program; the layer used is called “Fire Hazard Severity Zones DRAFT, 9-2007, Very High Zones in LRA.” The County’s parcel layer was used as the basis for the inventory of developed parcels. In some cases, there are parcels in multiple wildfire hazard zones. GIS was used to create a centroid, or point, representing the center of each parcel polygon, which was overlaid on the wildfire layer. For the purposes of this analysis, the wildfire hazard zone that intersected the centroid was assigned as the hazard zone for the entire parcel.

The parcels were segregated and analyzed for three areas or groups: entire Placer County planning area (unincorporated and cities combined), unincorporated only, and all cities. To further segregate by property type, a land use code table was joined to the parcel layer. The codes were simplified into six categories: Agricultural, Commercial, Industrial, Miscellaneous, Open Space, and Residential.

As Figure 4.32 in Section 4.2.20 Wildfire illustrates, there is a significant fire hazard in the eastern and central portions of the County, with most of the area zoned as a very high threat of wildfire. The western portion of the County ranges from moderate fire hazard zone in the foothills areas to nonwildfire/nonurban and urban unzoned in the far western portions of the County. Although the western portions of the County illustrate a limited wildfire threat, the area is still at risk to smaller grassfires, especially during the dry, hot summers. The topography and

fuel type in this area cannot be modeled using the fire hazard severity zone methodology previously described as the methodology was developed for wildland areas.

Values at Risk

Once the number of parcels and their values were determined, contents values were estimated (based on 50 percent of the assessed value) to determine total values at risk by hazard zone. Overlaying the fire hazard severity zone map with the County parcel layer, it is evident that the Placer County planning area has significant assets at risk to wildfire as detailed in Tables 4.49-4.50.

Table 4.49. Values at Risk from Wildfire—Placer County Planning Area: Detail Table

Cities and Unincorporated County												
	Moderate		High		Very High		Urban Unzoned		Non-Wildland / Non-Urban		Area Not Included	
Property Type	# of parcels	structure value	# of parcels	structure value	# of parcels	structure value	# of parcels	structure value	# of parcels	structure value	# of parcels	structure value
<i>Agriculture</i>	518	\$12,348,864	69	\$624,478	547	\$2,313,618	6	\$4,244	136	\$3,400,057	0	\$0
<i>Commercial</i>	860	\$242,353,898	232	\$80,246,300	1,174	\$291,463,046	1,438	\$1,381,779,164	20	\$22,034,663	288	\$135,854,648
<i>Industrial</i>	389	\$303,652,822	32	\$41,656,886	133	\$34,607,421	371	\$335,058,539	2	\$0	6	\$1,005,979
<i>Miscellaneous</i>	5,657	\$31,599,336	981	\$1,062,418	7,357	\$56,219,291	1,470	\$4,361,918	288	\$7,519,440	124	\$1,872,911
<i>Open Space</i>	249	\$2,423,556	43	\$6,220,646	277	\$134,630,478	144	\$15,039,087	15	\$426,564	3	\$0
<i>Residential</i>	33,005	\$8,047,425,867	6683	\$1,433,909,688	27,633	\$57,43,933,112	31,413	\$7,911,491,057	531	\$72,963,556	504	\$103,940,228
Total	40,861	\$8,639,804,343	8045	\$1,563,720,416	37,121	\$6,263,166,966	34,842	\$9,647,734,009	992	\$106,344,280	925	\$242,673,766

Sources: 2007 Certified Roll Values, Placer County Assessor's Office, California Department of Forestry and Fire Protection

Table 4.50. Values at Risk from Wildfire—Unincorporated Placer County

Unincorporated County												
	Moderate		High		Very High		Urban Unzoned		Non-Wildland / Non-Urban		Area Not Included	
Property Type	# of parcels	structure value	# of parcels	structure value	# of parcels	structure value	# of parcels	structure value	# of parcels	structure value	# of parcels	structure value
<i>Agriculture</i>	509	\$12,348,864	69	\$624,478	547	\$2,313,618	2	\$4,244	134	\$3,400,057	-	-
<i>Commercial</i>	426	\$178,828,573	134	\$49,638,991	1,047	\$265,306,044	369	\$595,752,577	6	\$144,023	-	-
<i>Industrial</i>	198	\$193,837,528	14	\$40,256,672	91	\$22,812,218	88	\$156,859,809	2	\$0	-	-
<i>Miscellaneous</i>	3,655	\$30,473,937	547	\$945,491	6,951	\$56,217,719	379	\$1,170,669	192	\$7,430,268	17	-
<i>Open Space</i>	110	\$1,892,456	39	\$6,220,646	259	\$134,630,478	7	\$8,166,607	10	\$426,564	-	-
<i>Residential</i>	17,072	\$4,212,719,692	3,157	\$755,575,609	26,456	\$5,577,670,401	6,128	\$1,970,976,873	139	\$37,661,514	37	\$5,625,053
Total	21,970	\$4,630,101,050	3,960	\$853,261,887	35,351	\$6,058,950,478	6,973	\$2,732,930,779	483	\$49,062,426	54	\$5,625,053

Sources: 2007 Certified Roll Values, Placer County Assessor's Office, California Department of Forestry and Fire Protection

Populations at Risk

Wildfire risk is of greatest concern to populations residing in the moderate, high, and very high wildfire hazard zones. Placer County Census 2000 population data from HAZUS-MH, aggregated by census block, and GIS were used to estimate populations within the hazard zones. A proportional division was performed to account for parcels that were split by wildfire hazard class boundaries and to better model population counts in the hazard classes. For example, a

census block that was split by a hazard class boundary (40 percent in high, 60 percent in moderate) had its “high” population attribute multiplied by .40 and its “moderate” population attribute multiplied by .60. Population counts were then sorted by jurisdiction as shown in Table 4.51.

Table 4.51. Populations at Risk to Wildfire: Placer County Planning Area

Wildfire Threat Level - Population						
Jurisdiction	Moderate	High	Very High	Urban Unzoned	Non-wildland/Non-urban	Total
Auburn	4,367	4,667	1,174	0	0	10,208
Colfax	0	0	1,356	0	0	1,356
Lincoln	2,152	0	0	9,019	66	11,238
Loomis	2,817	3	0	3,221	23	6,064
Rocklin	4,671	131	0	30,526	0	35,328
Unincorporated	42,621	6,708	30,848	19,258	1,016	100,451
Totals	56,628	11,509	33,378	62,024	1,105	164,645

Sources: HAZUS-MH MR3 (Census 2000), California Department of Forestry and Fire Protection

Cultural and Natural Resources at Risk

The Placer County planning area has substantial cultural and natural resources located throughout the County as previously described. In addition, there are other natural resources at risk when wildland-urban interface fires occur. One is the watershed and ecosystem losses that occur from wildland fires. This includes impacts to water supplies and water quality as well as air quality. Another is the aesthetic value of the area. Major fires that result in visible damage detract from that value. Other assets at risk include wildland recreation areas, wildlife and habitat areas, rangeland, and timber resources. The loss to these natural resources would be significant. Tourism is a major economic force in Placer County. Because many Placer County communities border Tahoe National Forest, the issues of watershed, forest products, wildlife, and recreation tourism are all critical elements to the County and surrounding areas and are all at risk from wildfire hazards.

Critical Facilities at Risk

Critical facilities are those community components that are most needed to withstand the impacts of disaster as previously described. An analysis was performed using GIS software to determine where critical facilities are located within wildfire threat zones. Figure 4.40 shows the critical facilities located in the Placer County planning area and unincorporated Placer County within the “High” and “Very High” threat areas. Tables 4.52 and 4.53 list the critical facilities in the different wildfire hazard zones for the entire Placer County planning area and for Unincorporated Placer County.

Table 4.52. Critical Facilities at Risk to Wildfire by Hazard Class: Placer County Planning Area

High Hazard Wildfire			
<i>Facility Type</i>	<i>Cities</i>	<i>Unincorporated</i>	<i>Total</i>
Airport	0	1	1
CalARP Facility	0	2	2
Fire Station	0	1	1
Hall	2	0	2
Hazmat Facility	0	1	1
Medical Facility	0	1	1
Public Utility	3	2	5
School	4	1	5
Train Station	0	1	1
	9	10	15
Very High Hazard Wildfire			
<i>Facility Type</i>	<i>Cities</i>	<i>Unincorporated</i>	<i>Total</i>
Airport	0	2	2
Animal Shelter	0	1	1
CalARP Facility	0	0	0
CHP Station	1	3	4
Correctional Facility	0	1	1
Dispatch Center	0	1	1
Emergency Operations	0	1	1
Fire Station	0	16	16
Hall	1	12	13
Hazmat Facility	0	0	0
Medical Facility	0	1	1
Police Station	1	3	4
Public Utility	5	43	48
School	0	13	13
Train Station	1	0	1
US Coast Guard	0	1	1
	9	98	107

Source: Placer County

Table 4.53. Critical Facilities at Risk to Wildfire by Hazard Class: Unincorporated Placer County

High Hazard Wildfire	
Airport	Auburn CALSTAR Heliport in Bowman
CalARP Facility	Placer County DPW
CalARP Facility	Placer County DPW
Fire Station	Placer Hills Fire Protection
Hazmat Facility	PLACER COUNTY SMD 1 WASTEWATER TREATMENT PLANT
Medical Facility	Colonial Health Care
Public Utility	Placer County SMD NO 1 Wastewater Treatment Plant
Public Utility	Auburn 6 mgd Water Treatment Plant
School	PCOE K-8 Community Independent Study Home
Train Station	Southern Pacific Trans Co
Very High Hazard Wildfire	
Airports	Blue Canyon-Nyack Airport
Airports	Homewood Seaplane Base
Animal Shelters	Tahoe Vista Government Center
CHP Stations	Foresthill Service Center
CHP Stations	Kings Beach Service Center
CHP Stations	Tahoe Substation
Correctional Facili*	Burton Creek Sub-Station
Dispatch Centers	Placer County Sheriff - Tahoe City
Emergency Operation*	County - Tahoe
Fire Stations	Alta Volunteer Fire Protection District
Fire Stations	Colfax Volunteer Fire Department
Fire Stations	Foresthill Fire Protection District
Fire Stations	Foresthill Fire Protection District
Fire Stations	Foresthill Fire Protection District
Fire Stations	Foresthill Fire Protection District
Fire Stations	Iowa Hill
Fire Stations	Northstar Fire Department
Fire Stations	North Tahoe Fire Protection
Fire Stations	North Tahoe Fire Protection
Fire Stations	North Tahoe Fire Protection
Fire Stations	North Tahoe Fire Protection
Fire Stations	North Tahoe Fire Protection
Fire Stations	North Tahoe Fire Protection
Fire Stations	Squaw Valley Fire Department

Fire Stations	Weimar Fire Station
Halls	County of Placer
Halls	Clay Lodge Masonic Temple Association
Halls	Dutch Flat Community Club
Halls	Dutch Flat Swimming Pool Corporation
Halls	Lake Tahoe Labor Temple Association
Halls	Leland Stanford Jr Univ et al
Halls	McCauley Keith & Kari
Halls	Oddfellows Lodge #81 IO
Halls	Squaw Creek Associates
Halls	Squaw Valley Road LLC
Halls	Tahoe City Public Utility District
Halls	Talmont Resort Improvement District
Medical Facility	Placer Medical Clinic
Police Stations	Foresthill Service Center
Police Stations	Kings Beach Service Center
Police Stations	Tahoe Substation
Public Utility	Alta 0 mgd Water Treatment Plant
Public Utility	Alta Plant Tank #2 100,000 Gal. Tank
Public Utility	Alta Tank #1 100,000 Gal. Tank
Public Utility	Foresthill Public Utility District
Public Utility	Foresthill Public Utility District
Public Utility	Monte Vista 0mgd Water Treatment Plant
Public Utility	Monte Vista 60,000 Gal. Tank
Public Utility	NTPUD
Public Utility	NTPUD 120,000 Gal. Water Tank
Public Utility	NTPUD 500,000 Gal. Water Tank
Public Utility	NTPUD 500,000 Gal. Water Tank
Public Utility	NTPUD 500,000 Gal. Water Tank
Public Utility	NTPUD 500,000 Gal. Water Tank
Public Utility	NTPUD C-1 Sewer Lift Station
Public Utility	NTPUD C-2 Sewer Lift Station
Public Utility	NTPUD Carnelian Main Sewer Lift Station
Public Utility	NTPUD Carnelian Woods #1 500,000 Gal. Water Tank
Public Utility	NTPUD Carnelian Woods #2 500,000 Gal. Water Tank
Public Utility	NTPUD Carnelian Woods #2 Booster Pump Station
Public Utility	NTPUD Carnelian Woods Well #1
Public Utility	NTPUD D-1 Sewer Lift Station
Public Utility	NTPUD D-2 Sewer Lift Station

Public Utility	NTPUD D-3 Sewer Lift Station
Public Utility	NTPUD D-4 Sewer Lift Station
Public Utility	NTPUD D-5 Sewer Lift Station
Public Utility	NTPUD D-6 Sewer Lift Station
Public Utility	NTPUD D-7 Sewer Lift Station
Public Utility	NTPUD Dollar Hill 350,000 Gal. Water Tank
Public Utility	NTPUD Dollar Main Sewer Lift Station
Public Utility	NTPUD Kingswood Booster Pump Station
Public Utility	NTPUD Kingswood West Booster Pump Station
Public Utility	NTPUD Mashie Sewer Lift Station
Public Utility	NTPUD Moondunes Sewer Lift Station
Public Utility	NTPUD N-2 Sewer Lift Station
Public Utility	NTPUD N-3 Sewer Lift Station
Public Utility	NTPUD National Ave Sewer Lift Station
Public Utility	NTPUD Park Well
Public Utility	NTPUD S-1 Sewer Lift Station
Public Utility	NTPUD S-2 Sewer Lift Station
Public Utility	NTPUD Secline St. Sewer Lift Station
Public Utility	NTPUD Sewer Lift Station
Public Utility	Schafer Mill Rd 500,000 Gal. Tank
Public Utility	Water Treatment Plant & Lake Intake
Schools	Alta-Dutch Flat Elementary School
Schools	Coldstream Alternative School
Schools	Colfax Elementary School
Schools	Colfax High School
Schools	Emigrant Gap Elementary School
Schools	Foresthill Divide Middle School
Schools	Foresthill Elementary School
Schools	Foresthill High School
Schools	Kings Beach Elementary School
Schools	North Tahoe High School
Schools	North Tahoe Middle School
Schools	Tahoe Lake Elementary School
Schools	Weimar Hills Middle School
US Coast Guard	U.S. Coast Guard Station Lake Tahoe

Source: Placer County

Development Trends

Population growth and development in Placer County is on the rise. Additional growth and development within the wildland-urban interface will continue to increase the risk and vulnerability of the planning area to damaging wildfires.

Overall Community Impact

The overall impact to the community from a severe wildfire includes:

- Injury and loss of life;
- Commercial and residential structural damage;
- Decreased water quality in area watersheds;
- Increase in post-fire hazards such as flooding, sedimentation, and mudslides;
- Damage to natural resource habitats and other resources, such as timber and rangeland;
- Loss of water, power, roads, phones, and transportation, which could impact, strand, and/or impair mobility for emergency responders and/or area residents;
- Economic losses (jobs, sales, tax revenue) associated with loss of commercial structures;
- Negative impact on commercial and residential property values;
- Loss of churches, which could severely impact the social fabric of the community;
- Loss of schools, which could severely impact the entire school system and disrupt families and teachers, as temporary facilities and relocations would likely be needed; and
- Impact on the overall mental health of the community.

Vulnerability to Earthquake

Likelihood of Future Occurrence—Occasional

Vulnerability—Medium

Earthquake vulnerability is primarily based on population and the built environment. Urban areas in high seismic hazard zones are the most vulnerable, while uninhabited areas are less vulnerable.

Ground shaking is the primary earthquake hazard. Many factors affect the survivability of structures and systems from earthquake-caused ground motions. These factors include proximity to the fault, direction of rupture, epicentral location and depth, magnitude, local geologic and soils conditions, types and quality of construction, building configurations and heights, and comparable factors that relate to utility, transportation, and other network systems. Ground motions become structurally damaging when average peak accelerations reach 10 to 15 percent of gravity, average peak velocities reach 8 to 12 centimeters per second, and when the Modified Mercalli Intensity Scale is about VII (18-34 percent peak ground acceleration), which is considered to be very strong (general alarm; walls crack; plaster falls).

Fault rupture itself contributes very little to damage unless the structure or system element crosses the active fault. There are no known potentially active faults in the planning area. In

general, newer construction is more earthquake resistant than older construction because of improved building codes and their enforcement. Manufactured housing is very susceptible to damage because their foundation systems are rarely braced for earthquake motions. Locally generated earthquake motions, even from very moderate events, tend to be more damaging to smaller buildings, especially those constructed of unreinforced masonry, as was seen in the Oroville, Coalinga, Santa Cruz, and Paso Robles earthquakes.

Common impacts from earthquakes include damage to infrastructure and buildings (e.g., crumbling of unreinforced masonry, failure of architectural facades, rupturing of underground utilities, and road closures). Earthquakes also frequently trigger secondary hazards, such as dam failures, landslides and rock falls, explosions, and fires that can become disasters themselves.

Estimating Potential Losses

Earthquake losses will vary across the Placer County planning area depending on the source and magnitude of the event. The earthquake scenarios run for the 2005 LHMP for eastern and western Placer County provide a good estimate of loss to the planning area based on a realistic earthquake scenario. The results of these scenarios are reproduced below in Table 4.49. To further evaluate potential losses associated with earthquake activity in the planning area, a HAZUS-MH probabilistic earthquake scenario was run for this LHMP Update, using the latest version of HAZUS-MH (MR3 released in October 2007).

2005 Earthquake Scenarios

HAZUS-MH was utilized to model earthquake losses for Placer County. Two different scenarios were chosen to represent two very distinct differences in earthquake hazards and vulnerabilities between eastern and western Placer County based on current and historic data. The division between eastern and western Placer County is not based on any identifiable boundary between the eastern and western portion of the County, but utilizes the faults with the greatest potential for a damaging earthquake in the County. For western Placer, the epicenter was located on a Late Quaternary age fault located in Auburn. For eastern Placer, the epicenter was located on a Holocene age fault submerged under Lake Tahoe. These scenarios are arbitrary “what if” events defined by the HMPC based on historical earthquake data in and around Placer County. Specifically, the probable magnitude used for western Placer County utilized the 5.7 magnitude of the Oroville earthquake, which had the greatest historical impact to the western portion of the County. The probable magnitude used for eastern Placer County was based on recent (1999) data on earthquake hazards in the Lake Tahoe basin. Level 1 analyses were run, meaning that only the default data was used and not supplemented with local building inventory or hazard data. There are certain data limitations when using the default data, so the results should be interpreted accordingly; this is a planning level analysis. The two scenarios were defined as follows:

Eastern Placer County Scenario

- Epicenter located on Holocene age (200-10,000 years old) fault submerged under Lake Tahoe (Lat: 39.15; Long: -120.05)

- 6.9 Magnitude at 32 km (20 miles) depth

According to HAZUS this moderate sized event in eastern Placer County could induce significant economic loss in the vicinity of \$125.4 million.

Western Placer County Scenario

- Epicenter located on a Late Quaternary age (10,000-700,000 years old) fault located in Auburn (Lat: 38.89; Long: -121.08)
- 5.7 Magnitude at 8 km (5 miles) depth.

According to HAZUS this moderate sized event could induce significant economic loss in the vicinity of \$217.81 million.

Table 4.54 summarizes these results.

Table 4.54 HAZUS-MH Earthquake Scenario Results

Impacts/Earthquake	Eastern Placer County M5.7/ Depth 5 miles	Western Placer County M6.9/ Depth 20 miles
Residential Bldgs. Damaged (Based upon buildings)	Slight: 4,640 Moderate: 1,585 Extensive: 130 Complete: 28	Slight: 9,264 Moderate: 2,641 Extensive: 304 Complete: 22
Injuries (Based upon 2pm time of occurrence)	Without requiring hospitalization: 31 Requiring hospitalization: 6 Life Threatening: 1 Fatalities: 2	Without requiring hospitalization: 35 Requiring hospitalization: 5 Life Threatening: 1 Fatalities: 1
Displaced Households	36	78
Economic Loss	Property and Lifeline Damage: \$125.40M	Property and Lifeline Damage: \$217.81M
Damage to Schools (Based upon 26 buildings)	None with at least moderate damage	None with at least moderate damage
Damage to Hospital	None with at least moderate damage	None with at least moderate damage
Damage to Transportation Systems	None with at least moderate damage	None with at least moderate damage
Households w/out Power & Water Service (Based upon 7,211 households)	No loss of power Water loss @ Day 1: 126 Water loss @ Day 3: 0 Water loss @ Day 7: 0 Water loss @ Day 30: 0	No loss of power No loss of water

Source: AMEC/Placer County

2008 Earthquake Scenario

The methodology for running the probabilistic earthquake scenario used probabilistic seismic hazard contour maps developed by the U.S. Geological Survey (USGS) for the 2002 update of the National Seismic Hazard Maps that are included with HAZUS-MH. The USGS maps provide estimates of potential ground acceleration and spectral acceleration at periods of 0.3 second and

1.0 second, respectively. The 2,500 year return period analyzes ground shaking estimates with a 2 percent probability of being exceeded in 50 years, from the various seismic sources in the area. The International Building Code uses this level of ground shaking for building design in seismic areas and is more of a worst case scenario.

The results of the probabilistic scenario are captured in Table 4.55. Key losses included the following:

- Total economic loss estimated for the earthquake was \$2.5 billion, which includes building losses and lifeline losses based on the HAZUS-MH inventory.
- Building-related losses, including direct building losses and business interruption losses, totaled \$2.35 billion.
- Over 20 percent of the buildings in the County were at least moderately damaged. 2,276 buildings were completely destroyed.
- Over 60 percent of the building- and income-related losses were residential structures.
- 13 percent of the estimated losses were related to business interruptions.
- The mid-day earthquake caused the most casualties: 728.
- 68 percent of the households experienced a loss of potable water the first day after the earthquake.

Table 4.55. HAZUS-MH Earthquake Loss Estimation 2,500-Year Scenario Results

Type of Impact	Impacts to County
Total Buildings Damaged	Slight: 31,833 Moderate: 17,031 Extensive: 3,360 Complete: 941
Building and Income Related Losses	\$2.35 billion 62 percent of damage related to residential structures 13 percent of loss due to business interruption
Total Economic Losses (Includes building, income and lifeline losses)	\$2.5 billion
Casualties (Based on 2 a.m. time of occurrence)	Without requiring hospitalization: 335 Requiring hospitalization: 57 Life threatening: 5 Fatalities: 8
Casualties (Based on 2 p.m. time of occurrence)	Without requiring hospitalization: 728 Requiring hospitalization: 179 Life threatening: 27 Fatalities: 51
Casualties (Based on 5 p.m. time of occurrence)	Without requiring hospitalization: 580 Requiring hospitalization: 168 Life threatening: 89 Fatalities: 47
Damage to Transportation Systems	13 highway bridges, moderate damage 1 airport facility, moderate damage \$37.5 million in economic losses

Type of Impact	Impacts to County
Damage to Essential Facilities	No facilities with at least moderate damage >50%; 2 hospitals, 98 schools, 10 police stations, 12 fire stations with functionality >50% on day 1
Damage to Utility Systems	1 utility system facility with at least moderate damage Potable water breaks: 1,089 Wastewater breaks: 861 Natural gas breaks: 920 \$117.4 million economic losses
Households without Power/Water Service (Based on 252,940 total households)	Power loss, Day 1: 4,727 Power loss, Day 3: 2,875 Power loss, Day 7: 1,150 Power loss, Day 30: 215 Power loss, Day 90: 7 Water loss, Day 1: 63,234 Water loss, Day 3: 61,312 Water loss, Day 7: 57,022 Water loss, Day 30: 17,529 Water loss, Day 90: 0
Displaced Households	1,060
Shelter Requirements	634
Debris Generation	0 million tons

Source: HAZUS-MH MR3

A map showing the peak ground accelerations by Census tract is shown in Figure 4.42. The warm, yellow color tones indicate damaging levels of shaking. The eastern portion of the County should experience the greatest shaking levels and damage.

Figure 4.42. Placer Earthquake Shaking

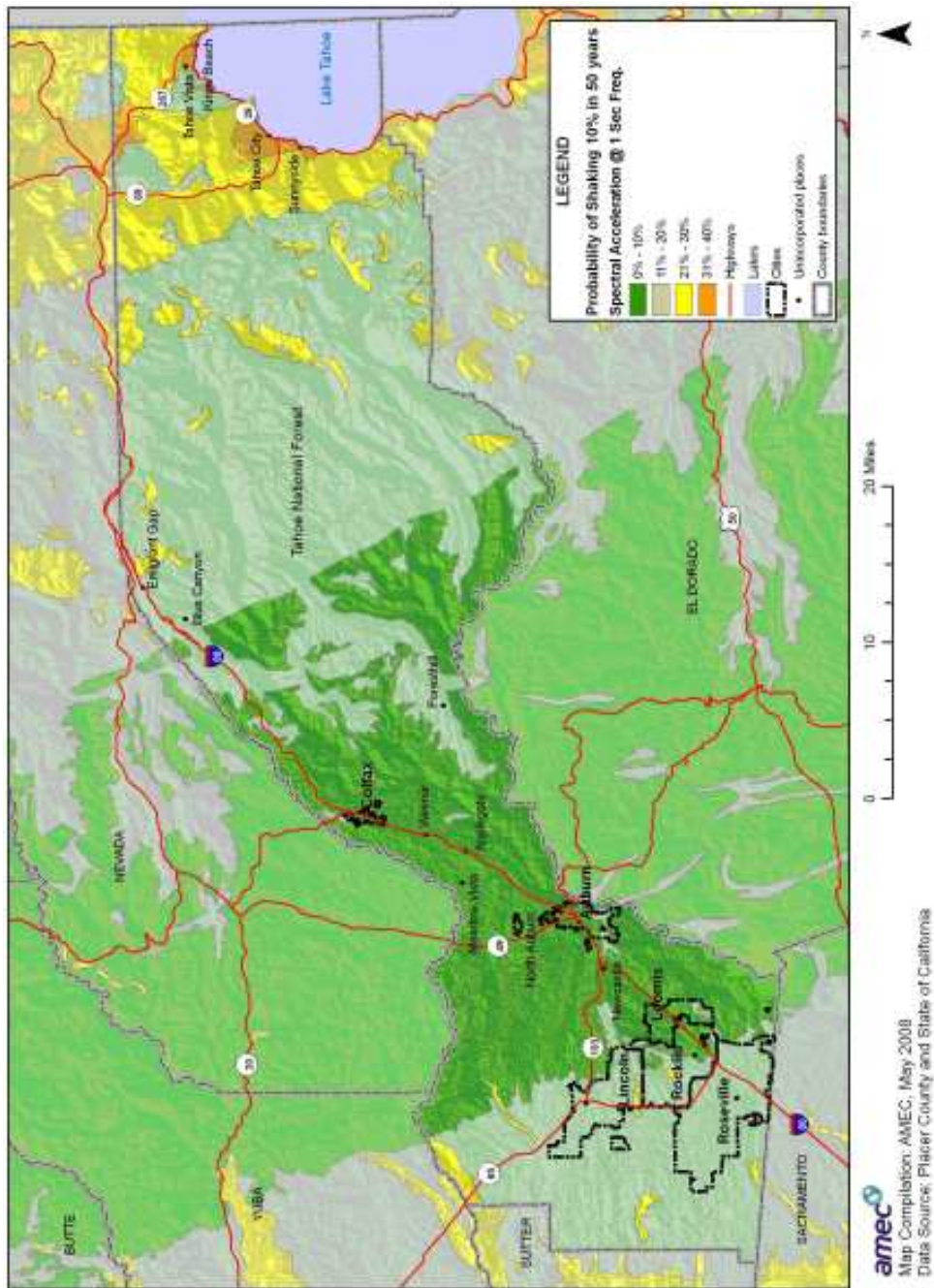
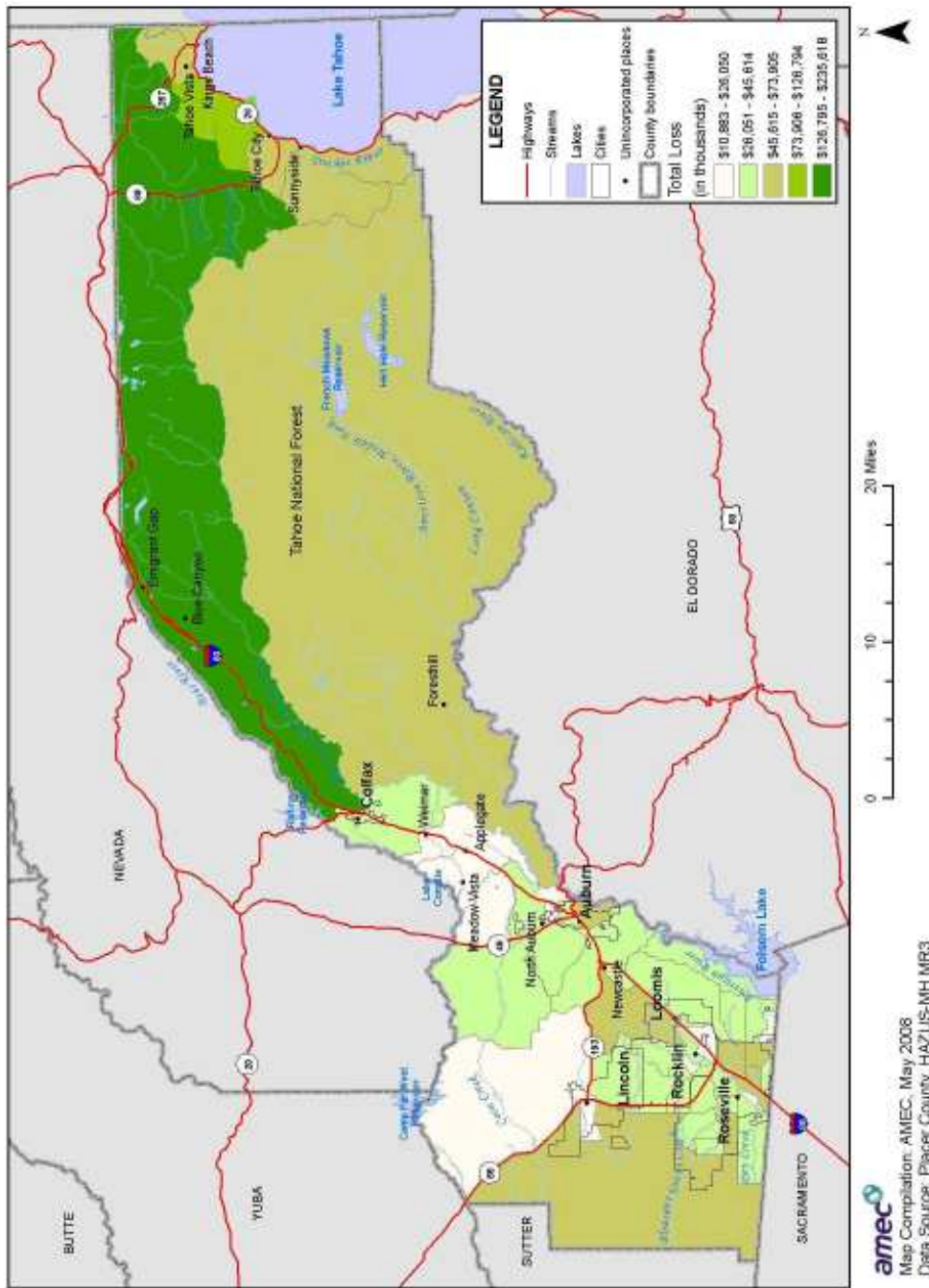


Figure 4.43 illustrates economic loss within the Placer County planning area associated with the 2,500 probabilistic earthquake scenarios.

Figure 4.43. Placer 2,500-Year HAZUS Earthquake Scenario



Source: HAZUS-MH MR3

Other Hazards

For the other hazards identified as priority hazards in Section 4.2, information is provided here where the potential impacts could be developed or inferred. Losses and impacts cannot be tied to specific locations based on available information. To some extent, most of the planning area is subject to these hazards. The following sections describe the vulnerability of the Placer County planning area to agricultural hazards, dam failure, drought, landslides, seiche, and severe weather (extreme temperatures, heavy rain/thunderstorm/hail/lightning/wind, and snow),

Vulnerability to Agricultural Hazards

Likelihood of Future Occurrence—Highly Likely

Vulnerability—Medium

Given the importance of agriculture to Placer County, agricultural hazards continue to be an ongoing concern. The primary causes of agricultural losses are severe weather events, such as drought and freeze and, to a limited extent, insect infestations. According to the HMPC, agricultural losses occur on an annual basis throughout the County and are usually associated with these severe weather events.

Vulnerability to Dam Failure

Likelihood of Future Occurrence—Occasional

Vulnerability—High

Dam failure flooding can occur as the result of partial or complete collapse of an impoundment. Dam failures often result from prolonged rainfall and flooding. The primary danger associated with dam failure is the high velocity flooding of those properties downstream of the dam.

A dam failure can range from a small, uncontrolled release to a catastrophic failure. Vulnerability to dam failures is confined to the areas subject to inundation downstream of the facility. Secondary losses would include loss of the multi-use functions of the facility and associated revenues that accompany those functions.

Dam failure flooding would vary by community depending on which dam fails and the nature and extent of the dam failure and associated flooding. Based on the risk assessment, it is apparent that a major dam failure could have a devastating impact on the planning area. Dam failure flooding presents a threat to life and property, including buildings, their contents, and their use. Large flood events can affect crops and livestock as well as lifeline utilities (e.g., water, sewerage, and power), transportation, jobs, tourism, the environment, and the local and regional economies.

According to the Placer County General Plan Background Report, only four dams within Placer County have the potential to threaten more than 100 persons. According to the report, a catastrophic failure of any of these dams could have a significant impact on Placer County. The

failure of any of these dams would cause downstream flooding and would likely result in loss of life and property. The potential magnitude of a dam failure depends on the time of year and the base flow of the river when the failure occurs. During the winter months, when river flows are higher, the impact to the area would be much greater and evacuation times much less. Also identified in the Background report, four other dams in Placer County have the potential to threaten 100 or fewer persons, and two dams located outside of the County could threaten 100-200 people. Table 4.56 details the dams and area/population threatened from these dams.

Table 4.56. Major Dams with Potential to Impact the Placer County Planning Area

Dam	Stream	Capacity (Acre-feet)	Area Impacted	Population Threatened
Placer County				
Folsom Dikes 5 & 6	North Fork American River	1,120,000	Linda Creek, Cirby Creek and Dry Creek (City of Roseville); Elverta and Rio Linda (Sacramento County); possible failure of levees of the Natomas East Main Drainage Canal	25,352
Lake Tahoe	Truckee River	840,000	Contained within Truckee River floodway to Nevada County	1,000
Camp Far West	Bear River	425	Bear River sw to Sheridan; Hwy. 65; numerous local roads; Southern Pacific Railroad tracks	470
Lake Combie	Bear River	8,773	Bear River to Camp Far West Reservoir; Hwy. 49	200
Lake Valley	North Fork American River	993	PG&E Lodgepole Campground; developments along North Fork of American River;	100
North Fork	North Fork American River	14,700	Downstream areas	Recreationists*
French Meadows	Middle Fork American River	134,000	French Meadows Road; Hwy. 49 on the North Fork of the American River	20
Sugar Pine	North Shirrtail Creek	10,964	Iowa Hill Road, Shirrtail Canyon Road, Yankee Jim's Road	Recreationists
Outside Placer County				
Rollins Reservoir	Bear River	45,410	Downstream areas	100-200
Stumpy Meadows	Fancher Creek & Hog Creek	9,600	Downstream areas	100-200

*Contingent on number of people recreating at the time of failure

Source: Placer County General Plan Background Report.

Inundation maps prepared by dam owners are on file with the County, and for national security purposes, can only be accessed through the Placer County OES. The Placer County OES has also

developed an evacuation plan that specifies emergency procedures for evacuation, control, and re-entry of areas at risk for possible dam inundation.

Vulnerability to Drought

Likelihood of Future Occurrence—Occasional

Vulnerability—High

Drought is different than many of the other natural hazards in that it is not a distinct event and usually has a slow onset. Drought can severely impact a region both physically and economically. Drought affects different sectors in different ways and with varying intensities. Adequate water is the most critical issue for agricultural, manufacturing, tourism, recreation, and commercial and domestic use. As the population in the area continues to grow, so will the demand for water.

Based on historical information, the occurrence of drought in California, including Placer County, is cyclical, driven by weather patterns. Drought has occurred in the past and will occur in the future. Periods of actual drought with adverse impacts can vary in duration, and the period between droughts is often extended. Although an area may be under an extended dry period, determining when it becomes a drought is based on impacts to individual water users. The vulnerability of Placer County to drought is countywide, but impacts may vary and include reduction in water supply, agricultural losses, and an increase in dry fuels.

Vulnerability to Landslides

Likelihood of Future Occurrence—Occasional

Vulnerability—Low

Landslides are a documented hazard in the County. Impacts from landslides primarily involve damage to infrastructure, utility systems, and roads. Road closures can further impact emergency response and evacuation efforts and interrupt business and school activities. Historically landslides resulting in significant losses have been limited within the Placer County planning area. Specific problem areas were previously identified in Section 4.1. Based on historical data, landslides will likely continue to occur in sloped areas throughout the county, but the overall vulnerability of the Placer County planning area remains low.

Vulnerability to Seiche:

Likelihood of Future Occurrence—Unlikely

Vulnerability—High

Research from the University of Nevada estimates that an earthquake must be at least a magnitude 6.5 to cause a damaging seiche at Lake Tahoe. The two faults directly underneath the lake are considered capable of generating magnitude 7.1 earthquakes. Computer models of seiche activity at Lake Tahoe prepared by the University of Nevada research team estimate that waves as high as 30 feet could strike the shore. These projections suggest largest waves might

hit Sugar Pine Point, Rubicon Point and the casinos in South Lake Tahoe. The seiche risk is potentially devastating as hundreds of houses are built along the lake and more than 17,000 people enjoy the Lake Tahoe shoreline every day in the summer.

In a recent 2008 California Statewide Exercise conducted to evaluate state and regional response capabilities, a seiche scenario was conducted on the Lake Tahoe Basin Area. The potential scenario was developed with input from researchers from the University of Nevada. This exercise scenario provides information on the potential risk and vulnerability of a seiche occurring on Lake Tahoe. The exercise timeline and ground provides is reproduced below:

Golden Guardian 2008 Exercise

Timeline and Ground Truths

TIMELINE:

- **8:55 am on November 6** - Mt. Rose is hit with a subterranean magnitude 6.8 earthquake, which causes minor to major damage in the Lake Tahoe Basin. An underwater shelf, in the Crystal Bay area, experiences a sluffing of a large mass of earth, which pushes a large volume of water southward and a smaller amount northward (generating seiche waves). The first wave at 6 ft in height begins to travel southward the width of the lake in Lake Tahoe at 180 miles per hour. As the wave approaches the southern part of Lake Tahoe it meets the rising floor of the lake and pushes up the wave's height to 18-20 feet. It will take the first wave 5 minutes to travel the length of the lake. The wave has pushed 6 ft of water back into Crystal Basin and the Tahoe City area. The wave caused overflow of the dam at "Fannie Bridge" causing the overflowing water downstream into the Truckee River picking up and depositing large amount of debris along the way. A large portion of Tahoe City is underwater. The South Lake Tahoe area is also heavily impacted and underwater, specifically the City of South Lake Tahoe and Tahoe Keys areas.
- **9:03 am** - The second wave strikes the South Lake Tahoe area. This wave is moving at 80 miles per hour and is 18-20 feet or better in height. The water continues to push into the already damaged and submerged areas.
- **9:08 am** - The second wave strikes the northern area of Lake Tahoe. There is considerable damage and debris into the lake. Any low areas around the lake are reporting damage, flooding and debris (including peoples and animals).
- **9:13 am** - The third wave has traveled the length of the lake and struck the South Lake Tahoe area again. This one was traveling less than 80 miles per hour and is 15-19 feet in height.
- **9:18 am** - The third wave strikes the northern end of Lake Tahoe. This time the wave is only traveling at 50 miles per hour and is only 12 feet in height.
- **9:23 am** - The fourth and last wave strikes the South Lake Tahoe area and is traveling 30 miles per hour and only 9-12 feet in height.
- **9:28 am** - The fourth and last wave strike the North Lake Tahoe area traveling 15 miles per hour and only 3-6 feet in height.

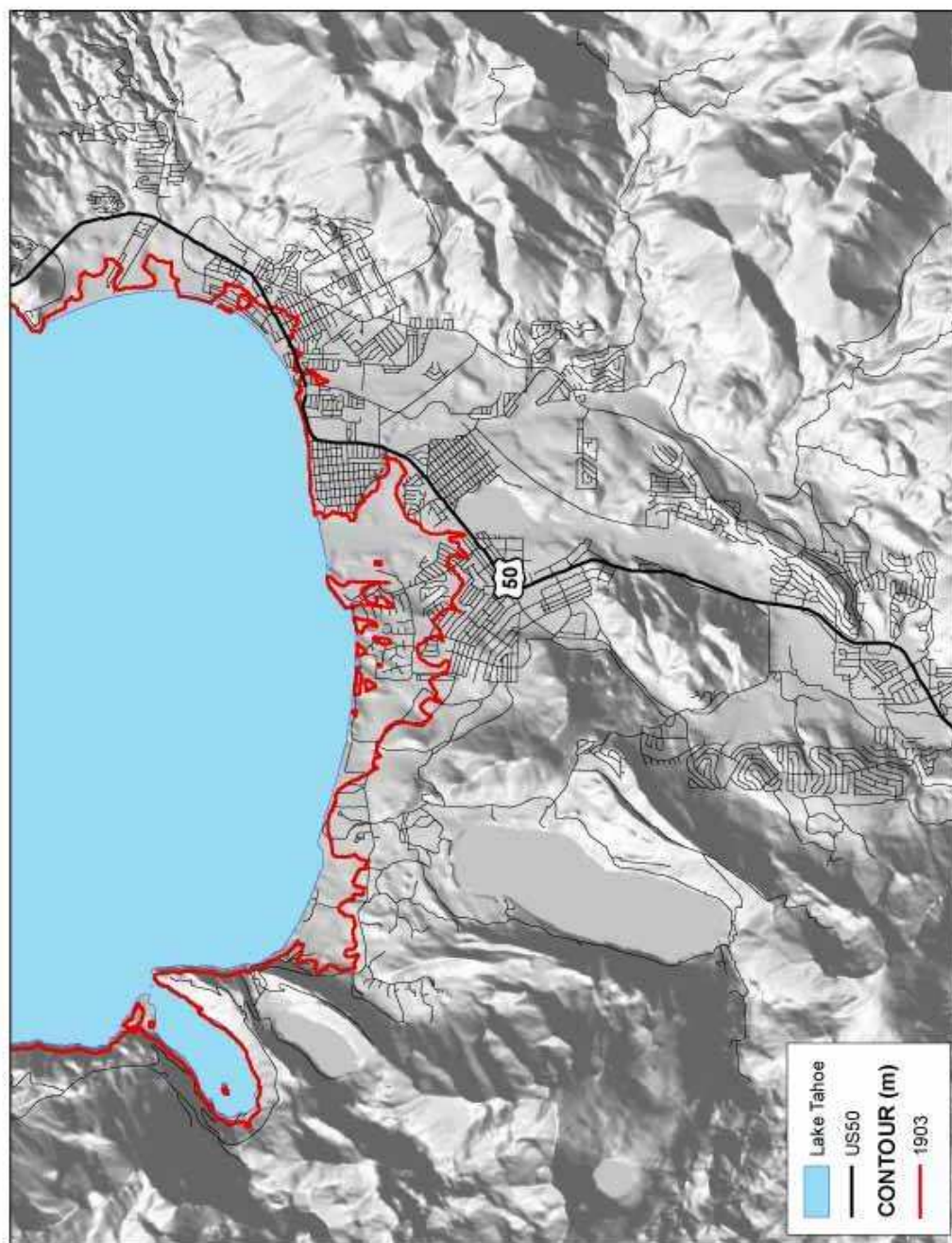
The seiche wave has traveled north to south on Lake Tahoe much like a bath tub wave. There is considerable damage in all low areas near the lake.

GROUND TRUTHS:

- Shoreline and nearby inland low lying areas of north Lake Tahoe of Placer County will be impacted, specifically west shores, Tahoe City and King Beach.
- HWY 89 from the “Y” south will be closed in certain sections for a minimum of 24-48 hrs due to washout of the highway and or blockage from debris.
- The large & strong waves overflowed the dam located near “Fannie Bridge” resulting HWY 89 from the “Y” north along the Truckee River corridor to close for 24-48 hrs due blockage of the highway from debris and a landslide near Alpine Meadows Road/River Ranch Inn.
- HWY 28 will be close for approx. 24 hrs due to blockage of debris, but unlike HWY 89 no damage/washout of sections of the highway.
- HWY 28 & HWY 267 junction temporarily close for approx. 12 hrs due to blockage by debris; however, HWY 267 remain open.

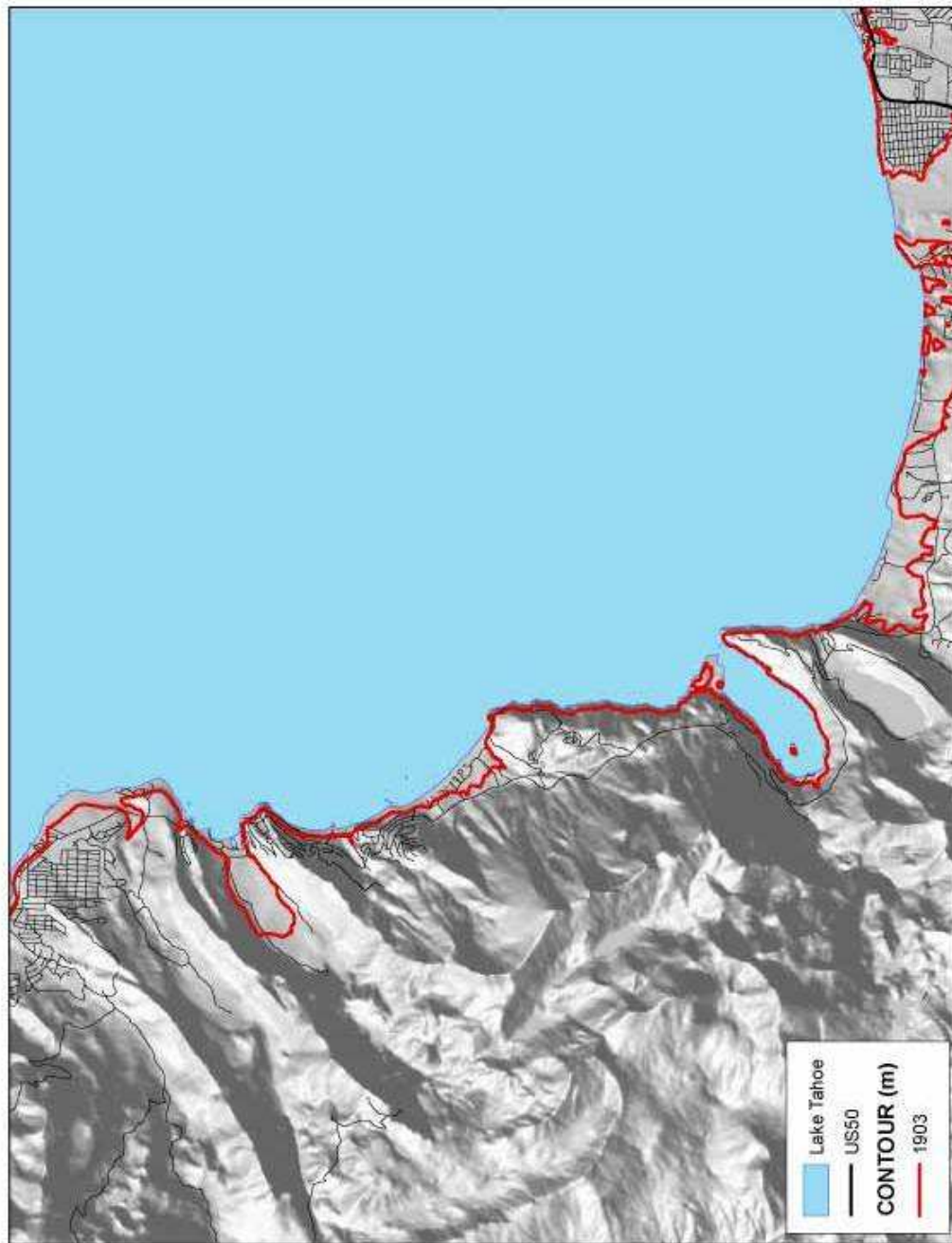
The magnitude 6.8 earthquake modeled for this exercise resulted in a peak acceleration of 0.1 to 0.2 g, a peak velocity of 5-10 cm/s, with felt effects being estimated at a Modified Mercalli Intensity Scale of VI to VII. The seiche was generated by a landslide at the north end of Lake Tahoe. This scenario estimated run-up of waters to elevations 6 m above lake level, with water arriving at shoreline 5 minutes after the earthquake. Inundation mapping of the seiche scenario done as part of the exercise identifies those areas most vulnerable to damage including loss of life and property damage. Figures 4.44-4.48 illustrate these inundation areas along Lake Tahoe. The red line on the maps defines the 1903 contour line where floodwaters are expected to reach. It is estimated that about 4,200 people live below the 1903 m countour line using 2002 census data. Estimates indicated that flooding to the 1903 m elevation will only flood the ground-level floor of structures with entrances near 1903 m, but will flood more in structures with entrances closer to the lake elevation. Again, depending on the time of day, the potential exists for many more people to be present recreating in the shoreline areas.

Figure 4.44. Placer Seiche Scenario 2008 Exercise: Tahoe Inundation Areas



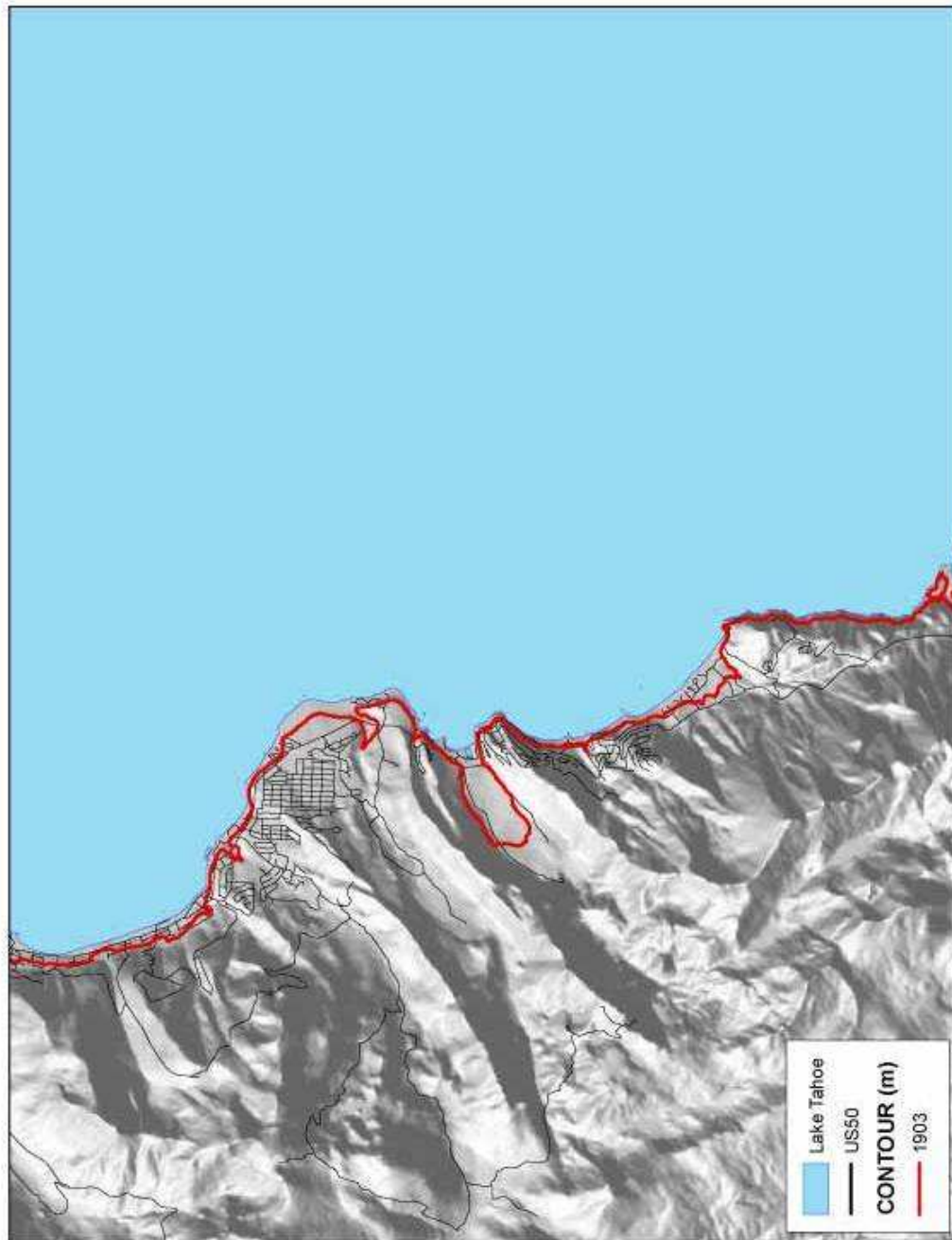
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Figure 4.45. Placer Seiche Scenario 2008 Exercise: Tahoe Inundation Areas



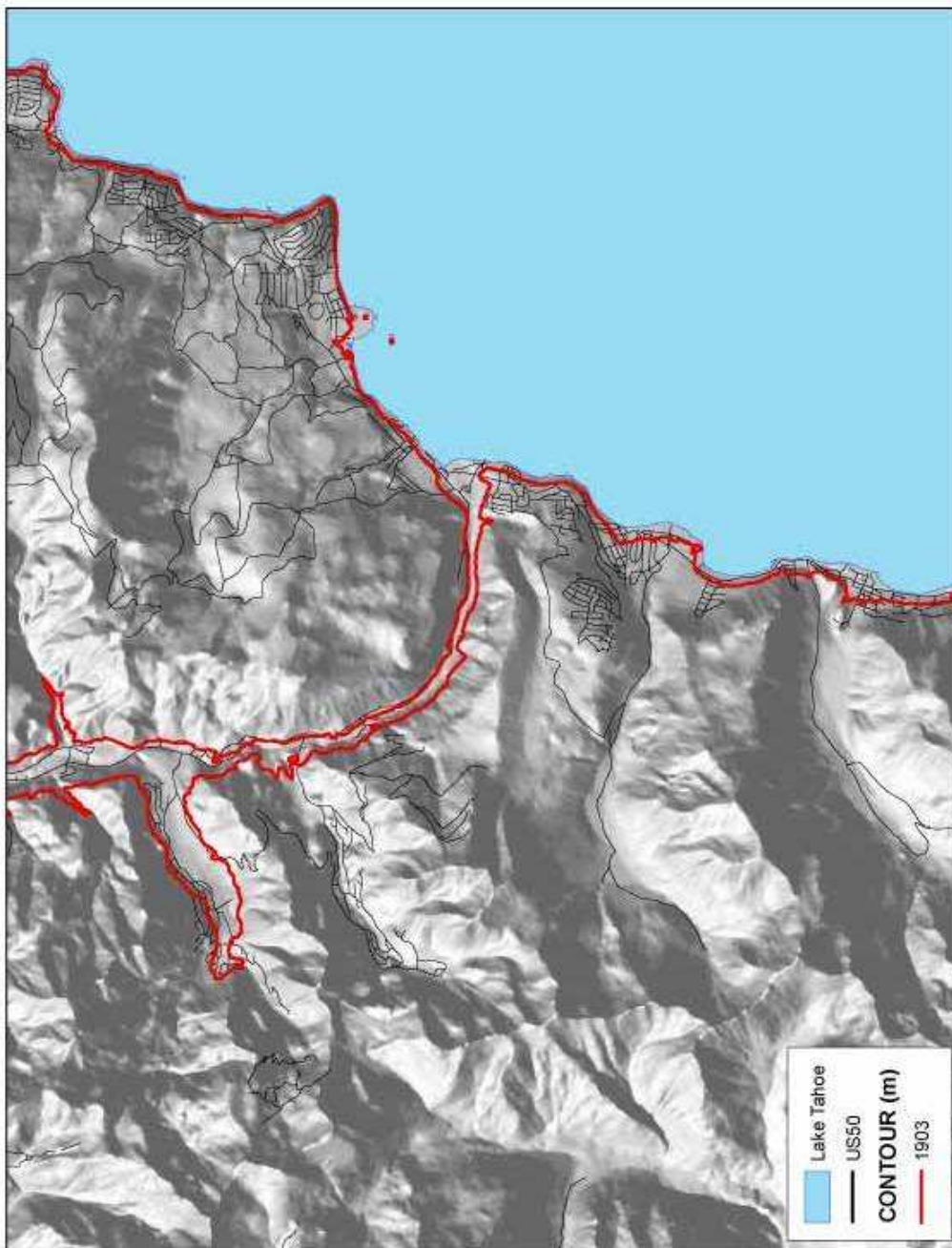
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Figure 4.46. Placer Seiche Scenario 2008 Exercise: Tahoe Inundation Areas



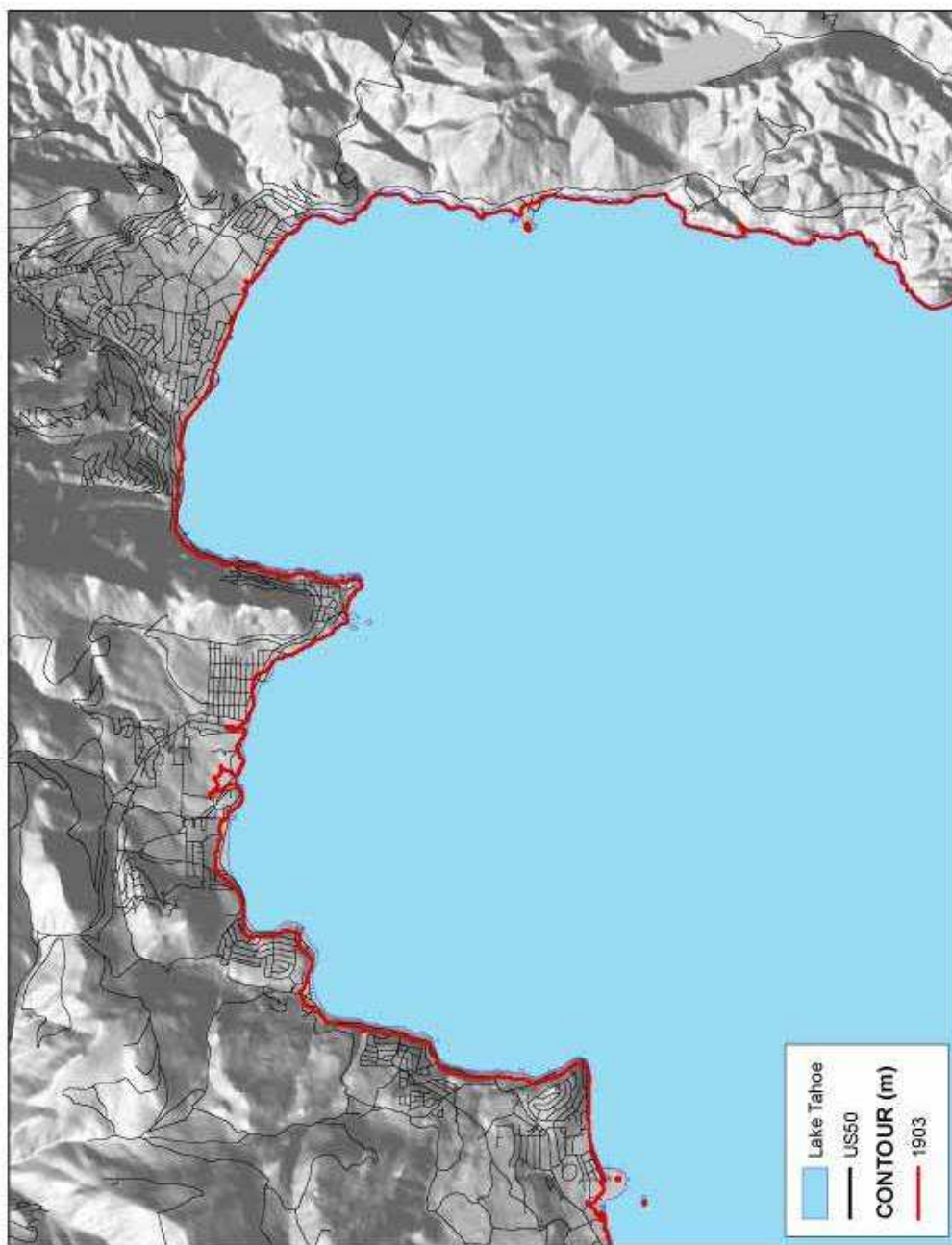
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Figure 4.47. Placer Seiche Scenario 2008 Exercise: Tahoe Inundation Areas



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Figure 4.48. Placer Seiche Scenario 2008 Exercise: Tahoe Inundation Areas



[Source needed](#)

Vulnerability to Severe Weather: Extreme Temperatures (Extreme Cold/Freeze and Extreme Heat)

Likelihood of Future Occurrence—Highly Likely

Vulnerability—Medium

Extreme temperature events happen in Placer County each year. The varying elevations in the County, in part, determine the extent to which a given area is affected by temperature extremes. The agricultural industry is especially vulnerable to extreme temperatures. Freezing temperatures can cause significant loss to crops, and excessive heat can cause high levels of mortality among livestock as well as damage to crops. Historically, extreme temperatures have caused large losses to agricultural crops and have resulted in several USDA disaster declarations.

Also of concern are impacts to sensitive populations such as the elderly and the young. Historically, severe heat has had the greatest impact on these sensitive populations, necessitating the use of cooling centers during extended periods of high temperatures.

Vulnerability to Severe Weather: Heavy Rain/Thunderstorm/Hail/Lightning/Wind

Likelihood of Future Occurrence—Highly Likely

Vulnerability—High

According to historical hazard data, severe weather is an annual occurrence in Placer County. Damage and disaster declarations related to severe weather have occurred and will continue to occur in the future. Heavy rain and thunderstorms are the most frequent type of severe weather occurrences in the County. Wind and lightning often accompany these storms and have caused damage in the past. However, actual damage associated with the primary effects of severe weather have been limited. It is the secondary hazards caused by weather, such as floods, fire, and agricultural losses that have had the greatest impact on the County. The risk and vulnerability associated with these secondary hazards are discussed in other sections.

Vulnerability to Severe Weather: Snow

Likelihood of Future Occurrence—Highly Likely

Vulnerability—Medium

Like most weather events, periods of heavy snow occur on an annual basis in the higher elevations of the county. Impacts to the county as a result of winter snow storms include damage to infrastructure, frozen pipes, utility outages, road closures, traffic accidents, and interruption in business and school activities. Also of concern is the impact to populations with special needs such as the elderly and those requiring the use of medical equipment. Delays in emergency response services can be of significant concern. Further, there are economic impacts associated with areas prone to heavy snow. Although the eastern portion of the county is the most vulnerable to the effects of snow, snowfall occurring in the lower elevations can create significant issues, as they may not be as prepared for snowfall.

4.4 Placer County Mitigation Capabilities

Thus far, the planning process has identified the natural hazards posing a threat to Placer County and described, in general, the vulnerability of the County to these risks. The next step is to assess what loss prevention mechanisms are already in place. This part of the planning process is the mitigation capability assessment. Combining the risk assessment with the mitigation capability assessment results in the County's "net vulnerability" to disasters, and more accurately focuses the goals, objectives, and proposed actions of this plan.

The HMPC used a two-step approach to conduct this assessment for the County. First, an inventory of common mitigation activities was made through the use of a matrix. The purpose of this effort was to identify policies and programs that were either in place, needed improvement, or could be undertaken if deemed appropriate. Second, the HMPC conducted an inventory and review of existing policies, regulations, plans, and programs to determine if they contributed to reducing hazard-related losses or if they inadvertently contributed to increasing such losses.

This section presents Placer County's mitigation capabilities and discusses select state and federal mitigation capabilities that are applicable to Placer County. Information about capabilities specific to the other participating jurisdictions can be found in the annexes.

Similar to the HMPC's effort to describe hazards, risks, and vulnerability of Placer County, this mitigation capability assessment describes the County's existing capabilities, programs, and policies currently in use to reduce hazard impacts or that could be used to implement hazard mitigation activities. This assessment is divided into four sections: regulatory mitigation capabilities; administrative and technical mitigation capabilities; fiscal mitigation capabilities; and mitigation outreach and partnerships.

4.4.1 Placer County Regulatory Mitigation Capabilities

Table 4.57 lists planning and land management tools typically used by local jurisdictions to implement hazard mitigation activities and indicates those that are in place in Placer County. Excerpts from applicable policies, regulations, and plans and program descriptions follow to provide more detail on existing mitigation capabilities.

Table 4.57. Placer County Regulatory Mitigation Capabilities

Regulatory Tool (ordinances, codes, plans)	Y/N	Comments
General plan	Y	Updated in 1994; See County Website
Zoning ordinance	Y	See County Website
Subdivision ordinance	Y	See County Website
Site plan review requirements	Y	
Growth management ordinance	N	

Regulatory Tool (ordinances, codes, plans)	Y/N	Comments
Floodplain ordinance	Y	Placer County Code Article 15.52 Flood Damage Prevention Regulations
Other special purpose ordinance (e.g., stormwater, steep slope, wildfire)	Y	Stormwater Ordinance: Placer County Code Article 8.28 Stormwater Quality
Building code	Y	Version: 2007 California. Building Code
BCEGS rating	Y	Class 2 for 1 & 2 family dwellings and Class 2 for all other construction
Fire department ISO rating		
Erosion or sediment control program	Y	Article 15.48 Grading, Erosion, and Sediment Control
Stormwater management program	Y	Http://www.placer.ca.gov/Departments/Works/StrmWtr.aspx
Capital improvements plan	Y	
Economic development plan		
Local emergency operations plan	Y	
Other special plans		
Flood insurance study or other engineering study for streams	Y	See Placer County Flood Control and Water Conservation District
Elevation certificates	Y	Keep on file CRDA Engineering and Surveying
Other	Y	CRS score: Class 5 (effective May 1, 2009)

Source: Placer County

As indicated in the tables above, Placer County has several plans and programs that guide the County's mitigation of development of hazard-prone areas. Starting with the Placer County General Plan, which is the most comprehensive of the County's plans when it comes to mitigation, some of these are described in more detail below.

Placer County General Plan

The Placer County General Plan consists of multiple documents: the countywide General Plan Background Report; the countywide General Plan Policy Document; and numerous regional, community, and specific plans. This discussion is derived primarily from the General Plan Policy Document. The text that follows is largely extracted from the Placer County General Plan Policy Document, 1994.

The Placer County General Plan is a comprehensive, long-term framework for the protection of the County's agricultural, natural, and cultural resources and for development in the County. Designed to meet state general plan requirements, it outlines policies, standards, and programs and sets out plan proposals to guide day-to-day decisions concerning Placer County's future. It is a legal document that serves as the County's "blueprint" or "constitution" for land use and development.

Health and Safety Element

Planning for growth and development requires the consideration of a wide range of public safety issues. Many of the health and safety risks associated with development can be avoided through siting decisions made at the planning stages of development, while others may be lessened through the use of mitigation measures in the planning and land use regulation process. This element outlines Placer County's strategy for ensuring the maintenance of a healthy and safe physical environment. Applicable goals and policies are presented below.

Emergency Management and Public Safety

Policies in this section seek to create an effective emergency response and management system by ensuring that vital public infrastructure is designed to remain operational during and after a major disaster event by siting critical emergency response facilities as far from potential disaster impact areas as is practical, and through continuing public education and outreach on emergency preparedness and disaster response programs.

Goal 8.E:	To ensure the maintenance of an Emergency Management Program to effectively prepare for, respond to, recover from, and mitigate the effects of natural or technological disasters.
Policy 8.E.1:	The County shall continue to maintain, periodically update, and test the effectiveness of its Emergency Operations Plan.
Policy 8.E.2:	The County shall continue to coordinate emergency preparedness, response, recovery, and mitigation activities with special districts, service agencies, voluntary organizations, cities within the County, surrounding cities and counties, and state and federal agencies.
Policy 8.E.3:	The County shall continue to provide a high-visibility promotional program to inform the general public of emergency preparedness and disaster response procedures.
Policy 8.E.4:	The County shall, through its Office of Emergency Services, maintain the capability to effectively respond to emergency incidents.
Policy 8.E.5:	The County shall maintain an emergency operations center to coordinate emergency response, management, and recovery activities.
Policy 8.E.6:	The County shall ensure that the siting of critical emergency response facilities such as hospitals, fire stations, sheriff's offices and substations, dispatch centers, emergency operations centers, and other emergency service facilities and utilities have minimal exposure to flooding, seismic and geological effects, fire, avalanche, and explosions.

Goal 8.F:	To ensure the maintenance of an Emergency Management Program to effectively prepare for, respond to, recover from, and mitigate the effects of natural or technological disasters.
Policy 8.F.1:	The County shall not locate new County structures necessary for the protection of public safety and/or the provision of emergency services in areas subject to inundation, subsidence, slope failure, surface rupture, or ground failure in a seismic event. Exception to this policy may be granted if the only alternative location would be so distant as to jeopardize the safety of the community, given that adequate precautions are taken to protect the facility.
Policy 8.F.2:	The County shall, within its authority, ensure that emergency dispatch centers, emergency operations centers, communications systems, vital utilities, and other essential public facilities necessary for the continuity of government be designed in a manner that will allow them to remain operational during and following an earthquake or other disaster.

Fire Hazards

Policies in this section are designed to ensure that new development is constructed to minimize potential fire hazards, minimize the risk of fire in already developed areas, and to provide public education concerning fire prevention.

Goal 8.C:	To minimize the risk of loss of life, injury, and damage to property and watershed resources resulting from unwanted fires.
Policy 8.C.1:	The County shall ensure that development in high fire hazard areas is designed and constructed in a manner that minimizes the risk from fire hazards and meets all applicable state and County fire standards.
Policy 8.C.2:	The County shall require that discretionary permits for new development in fire hazard areas be conditioned to include requirements for fire-resistant vegetation, cleared fire breaks, or a long-term comprehensive fuel management program. Fire hazard reduction measures shall be incorporated into the design of development projects in fire hazard areas.
Policy 8.C.3:	The County shall require that new development meets state, County, and local fire district standards for fire protection.
Policy 8.C.4:	The County shall refer development proposals in the unincorporated County to the appropriate local fire agencies for review for compliance with fire safety standards. If dual responsibility exists, then both agencies shall review and comment relative to their area of responsibility. If standards are different or conflicting, the more stringent standards shall be applied.
Policy 8.C.5:	The County shall ensure that existing and new buildings of public assembly incorporate adequate fire protection measures to reduce the potential loss of life and property in accordance with state and local codes and ordinances.
Policy 8.C.6:	The County shall encourage fire protection agencies to continue education programs in schools, service clubs, organized groups, industry, utility companies, government agencies, press, radio, and television in order to increase public awareness of fire hazards within the County.
Policy 8.C.7:	The County shall work with local fire protection agencies, the California Department of Forestry and Fire Protection, and the U.S. Forest Service to promote the maintenance of existing fuel breaks and emergency access routes for effective fire suppression.
Policy 8.C.8:	The County shall encourage and promote installation and maintenance of smoke detectors in existing residences and commercial facilities that were constructed prior to the requirement for detector installation.
Policy 8.C.9:	The County shall work with local fire agencies to develop high-visibility fire prevention programs, including those offering voluntary home inspections and promoting awareness of home fire prevention measures.
Policy 8.C.10:	The County shall continue to implement state fire safety standards through enforcement of the applicable standards contained in the Placer County Land Development Manual.
Policy 8.C.11:	The County shall continue to work cooperatively with the California Department of Forestry and Fire Protection and local fire protection agencies in managing wildland fire hazards.
Policy 8.C.12:	The County shall support annexations and consolidations of fire districts and services to improve service delivery to the public.

Flood Hazards

Policies in this section are designed to minimize flood hazards by restricting development in flood-prone areas, requiring development that does occur in floodplains to be designed to avoid flood damage, and through public education about flood hazards.

Goal 8.B:	To minimize the risk of loss of life, injury, damage to property, and economic and social dislocations resulting from flood hazards.
Policy 8.B.1:	The County shall promote flood control measures that maintain natural conditions within the 100-year floodplain of rivers and streams.
Policy 8.B.2:	The County shall continue to participate in the Federal Flood Insurance Program.
Policy 8.B.3:	The County shall require flood-proofing of structures in areas subject to flooding.
Policy 8.B.4:	The County shall require that the design and location of dams and levees be in accordance with all applicable design standards and specifications and accepted state-of-the-art design and construction practices.
Policy 8.B.5:	The County shall coordinate with neighboring jurisdictions to mitigate the impacts of new development in Placer County that could increase or potentially affect runoff onto parcels downstream in a neighboring jurisdiction.
Policy 8.B.6:	The County shall prohibit the construction of facilities essential for emergencies and large public assembly in the 100-year floodplain, unless the structure and access to the structure are free from flood inundation.
Policy 8.B.7:	The County shall require flood control structures, facilities, and improvements to be designed to conserve resources, incorporate and preserve scenic values, and to incorporate opportunities for recreation, where appropriate.
Policy 8.B.8:	The County shall require that flood management programs avoid alteration of waterways and adjacent areas, whenever possible.

Seismic and Geological Hazards

Policies in this section seek to ensure that new buildings and facilities are designed to withstand seismic and geologic hazards.

Goal 8.A:	To minimize the loss of life, injury, and property damage due to seismic and geologic hazards.
Policy 8.A.1:	The County shall require the preparation of a soils engineering and geologic-seismic analysis prior to permitting development in areas prone to geological or seismic hazards (i.e., ground shaking, landslides, liquefaction, critically expansive soils, avalanche).
Policy 8.A.2:	The County shall require submission of a preliminary soils report, prepared by a registered civil engineer and based upon adequate test borings, for every major subdivision and for each individual lot where critically expansive soils have been identified or are expected to exist.
Policy 8.A.3:	The County shall prohibit the placement of habitable structures or individual sewage disposal systems on or in critically expansive soils unless suitable mitigation measures are incorporated to prevent the potential risks of these conditions.
Policy 8.A.4:	The County shall ensure that areas of slope instability are adequately investigated and that any development in these areas incorporates appropriate design provisions to prevent landsliding.
Policy 8.A.5:	In landslide hazard areas, the County shall prohibit avoidable alteration of land in a manner that could increase the hazard, including: concentration of water through drainage, irrigation, or septic systems; removal of vegetative cover; and steepening of slopes and undercutting the bases of slopes.
Policy 8.A.6:	The County shall require the preparation of drainage plans for development in hillside areas that direct runoff and drainage away from unstable slopes.
Policy 8.A.7:	In areas subject to severe ground shaking, the County shall require that new structures intended for human occupancy be designed and constructed to minimize risk to the safety of occupants.
Policy 8.A.8:	County shall continue to support scientific geologic investigations which refine, enlarge, and improve the body of knowledge on active fault zones, unstable areas, severe ground shaking, avalanche potential, and other hazardous conditions in Placer County.
Policy 8.A.9:	The County shall require that the location and/or design of any new buildings, facilities, or other

Goal 8.A:	To minimize the loss of life, injury, and property damage due to seismic and geologic hazards.
	development in areas subject to earthquake activity minimize exposure to danger from fault rupture or creep.
Policy 8.A.10:	The County shall require that new structures permitted in areas of high liquefaction potential be sited, designed, and constructed to minimize the dangers from damage due to earthquake-induced liquefaction.
Policy 8.A.11:	The County shall limit development in areas of steep or unstable slopes to minimize hazards caused by landslides or liquefaction.
Policy 8.A.12:	The County shall not issue permits for new development in potential avalanche hazard areas (PAHA) as designated in the Placer County Avalanche Management Ordinance unless project proponents can demonstrate that such development will be safe under anticipated snow loads and conditions of an avalanche.

Avalanche Hazards

Policies in this section seek to ensure that new development is sited and designed to withstand avalanche hazards and to minimize risk from existing avalanche hazards.

Goal 8.H:	To minimize the risk of loss of life, injury, and damage to property due to avalanche.
Policy 8.H.1:	The County shall maintain maps of potential avalanche hazard areas.
Policy 8.H.2:	The County shall require new development in areas of avalanche hazard to be sited, designed, and constructed to minimize avalanche hazards.

Land Use Element

The goals, policies, and implementation programs for these land use topics reflect a basic commitment to preserving certain resource characteristics of the County while maintaining economic productivity and allowing for urban growth. The intent of the policies is not to preclude intensive development but to direct it. Applicable goals and policies from the Land Use Element are presented below.

General Land Use

Policies in this section promote a wise use of County lands to meet present and future development needs.

Goal 1.A:	To promote the wise, efficient, and environmentally-sensitive use of Placer County lands to meet the present and future needs of Placer County residents and businesses.
Policy 1.A.1:	The County will promote the efficient use of land and natural resources.
Policy 1.A.2:	The County shall permit only low-intensity forms of development in areas with sensitive environmental resources or where natural or human-caused hazards are likely to pose a significant threat to health, safety, or property.

Public and Quasi-Public Facilities, Infrastructure

Policies in this section promote the development of public facilities to meet community and regional needs.

Goal 1.F:	To promote the wise, efficient, and environmentally-sensitive use of Placer County lands to meet the present and future needs of Placer County residents and businesses.
Policy 1.F.2:	The County shall seek to locate new public facilities necessary for emergency response, health care, and other critical functions outside areas subject to natural or manmade environmental hazards.

Visual and Scenic Resources

Policies in this section seek to preserve and enhance the County's visual and scenic resources by avoiding adverse impacts from development.

Goal 1.K:	To protect the visual and scenic resources of Placer County as important quality-of-life amenities for County residents and a principal asset in the promotion of recreation and tourism.
Policy 1.K.4:	The County shall require that new development incorporates sound soil conservation practices and minimizes land alterations. Land alterations should comply with the following guidelines: <ul style="list-style-type: none"> a. Limit cuts and fills; b. Limit grading to the smallest practical area of land; c. Limit land exposure to the shortest practical amount of time; d. Replant graded areas to ensure establishment of plant cover before the next rainy season; and e. Create grading contours that blend with the natural contours on site or with contours on property immediately adjacent to the area of development.
Policy 1.K.6:	The County shall require that new development on hillsides employ design, construction, and maintenance techniques that: <ul style="list-style-type: none"> a. Ensure that development near or on portions of hillsides do not cause or worsen natural hazards such as erosion, sedimentation, fire, or water quality concerns; b. Include erosion and sediment control measures including temporary vegetation sufficient to stabilize disturbed areas; c. Minimize risk to life and property from slope failure, landslides, and flooding; and d. Maintain the character and visual quality of the hillside.

Development Form and Design

Policies in this section seek to promote the quality and aesthetics of development in the County through the preservation of desirable design characteristics and through compliance with existing design standards and guidelines.

Goal 1.O:	To promote and enhance the quality and aesthetics of development in Placer County.
Policy 1.O.1:	Historically or architecturally significant buildings should be preserved and not be substantially changed in exterior appearance in ways that diminish their historical character, unless doing so is necessary to avoid or mitigate hazards, and other means of mitigation are infeasible. Such structures should be preserved and used as focal points of community design.

Public Facilities and Services Element

Applicable goals and policies from the Public Facilities and Services Element are presented below.

Water Supply and Delivery

Policies in this section seek to ensure an adequate water supply for both domestic and agricultural users by providing necessary facility improvements, ensuring water availability, and utilizing water conservation measures.

Goal 4.C:	To ensure the availability of an adequate and safe water supply for domestic use and the maintenance of high quality water in water bodies and aquifers used as sources of domestic supply.
Policy 4.C.1:	The County shall require proponents of new development to demonstrate the availability of a long-term, reliable water supply. The County shall require written certification from the service provider that either existing services are available or needed improvements will be made prior to occupancy. Where the County will approve groundwater as the domestic water source, test wells, appropriate testing, and/or report(s) from qualified professionals will be required substantiating the long-term availability of suitable groundwater.
Policy 4.C.2:	The County shall approve new development based on the following guidelines for water supply: a. Urban and suburban development should rely on public water systems using surface supply; b. Rural communities should rely on public water systems. In cases where parcels are larger than those defined as suburban and no public water system exists or can be extended to the property, individual wells may be permitted; and c. Agricultural areas should rely on public water systems where available, otherwise individual water wells are acceptable.
Policy 4.C.3:	The County shall encourage water purveyors to require that all new water services be metered.
Policy 4.C.4:	The County shall require that water supplies serving new development meet state water quality standards.
Policy 4.C.5:	The County shall require that new development adjacent to bodies of water used as domestic water sources adequately mitigate potential water quality impacts on these water bodies.
Policy 4.C.6:	The County shall promote efficient water use and reduced water demand by a. Requiring water-conserving design and equipment in new construction; b. Encouraging water-conserving landscaping and other conservation measures; c. Encouraging retrofitting existing development with water-conserving devices; and d. Encouraging water-conserving agricultural irrigation practices.
Policy 4.C.7:	The County shall promote the use of reclaimed wastewater to offset the demand for new water supplies.
Policy 4.C.8:	When considering formation of new water service agencies, the County shall favor systems Policy Document Public Facilities and Services owned and operated by a governmental entity over privately- or mutually-owned systems. The County will continue to authorize new privately- or mutually-owned systems only if system revenues and water supplies are adequate to serve existing and projected growth for the life of the system. The County shall ensure this through agreements or other mechanisms setting aside funds for long term capital improvements and operation and maintenance.
Policy 4.C.9:	The County shall support opportunities for groundwater users to convert to surface water supplies in problem areas.
Policy 4.C.10:	The County shall promote the development of surface water supplies for agricultural use in the western part of the County.
Policy 4.C.11:	The County shall protect the watersheds of all bodies of water associated with the storage and delivery of domestic water by limiting grading, construction of impervious surfaces, application of fertilizers, and development of septic systems within these watersheds.
Policy 4.C.12:	The County shall limit the annual rate of growth to 3 percent in areas where domestic water is supplied by individual or community wells. Where surface water supplies provide domestic water, the amount of growth shall be limited to what can be served by available surface water supplies assuming a 4-year drought period and usage of one acre foot of water per year per household.
Policy 4.C.13:	In implementation of groundwater use policies, the County will recognize the significant differences between groundwaters found in bedrock or "hardrock" formations of the

Goal 4.C:	To ensure the availability of an adequate and safe water supply for domestic use and the maintenance of high quality water in water bodies and aquifers used as sources of domestic supply.
	foothill/mountain region and those groundwaters found in the alluvial aquifers of the valley. The County should make distinctions between these water resources in its actions.

Sewage Collection, Treatment, and Disposal

Policies in this section seek to ensure adequate wastewater collection and treatment by providing necessary facility improvements and consolidations, requiring proper maintenance of systems, and ensuring the facilities meet local and state environmental regulations.

Goal 4.D:	To ensure adequate wastewater collection and treatment and the safe disposal of liquid and solid waste.
Policy 4.D.1:	The County shall limit the expansion of urban communities to areas where community wastewater treatment systems can be provided.
Policy 4.D.4:	The County shall promote efficient water use and reduced wastewater system demand by a. Requiring water-conserving design and equipment in new construction; b. Encouraging retrofitting with water-conserving devices; and c. Designing wastewater systems to minimize inflow and infiltration to the extent economically feasible.
Policy 4.D.7:	The County shall permit on-site sewage treatment and disposal on parcels where all current regulations can be met and where parcels have the area, soils, and other characteristics that permit such disposal facilities without threatening surface or groundwater quality or posing any other Policy Document Public Facilities and Services health hazards.

Stormwater Drainage

Policies in this section seek to ensure safe, efficient, and environmentally sound means to drain stormwater and provide flood control by providing necessary facility improvements, ensuring adequate funding, providing a means to detain/retain runoff, and ensuring the facilities meet state environmental regulations.

Goal 4.E:	To collect and dispose of stormwater in a manner that least inconveniences the public, reduces potential water-related damage, and enhances the environment.
Policy 4. E.1:	The County shall encourage the use of natural stormwater drainage systems to preserve and enhance natural features.
Policy 4. E.2:	The County shall support efforts to acquire land or obtain easements for drainage and other public uses of floodplains where it is desirable to maintain drainage channels in a natural state.
Policy 4. E.3:	The County shall consider using stormwater of adequate quality to replenish local groundwater basins, restore wetlands and riparian habitat, and irrigate agricultural lands.
Policy 4. E.4:	The County shall ensure that new storm drainage systems are designed in conformance with the Placer County Flood Control and Water Conservation District's Stormwater Management Manual and the County Land Development Manual.
Policy 4. E.5:	The County shall continue to implement and enforce its Grading Ordinance and Flood Damage Prevention Ordinance.
Policy 4. E.6:	The County shall continue to support the programs and policies of the watershed flood control plans developed by the Flood Control and Water Conservation District.
Policy 4. E.7:	The County shall prohibit the use of underground storm drain systems in rural and agricultural areas unless no other feasible alternatives are available for conveyance of stormwater from new development or when necessary to mitigate flood hazards.

Goal 4.E:	To collect and dispose of stormwater in a manner that least inconveniences the public, reduces potential water-related damage, and enhances the environment.
Policy 4. E.8:	The County shall consider recreational opportunities and aesthetics in the design of stormwater ponds and conveyance facilities.
Policy 4. E.9:	The County shall encourage good soil conservation practices in agricultural and urban areas and carefully examine the impact of proposed urban developments with regard to drainage courses.
Policy 4. E.10:	The County shall strive to improve the quality of runoff from urban and suburban development through use of appropriate and feasible mitigation measures including, but not limited to, artificial wetlands, grassy swales, infiltration/sedimentation basins, riparian setbacks, oil/grit separators, and other best management practices (BMPs).
Policy 4. E.11:	The County shall require new development to adequately mitigate increases in stormwater peak flows and/or volume. Mitigation measures should take into consideration impacts on adjoining lands in the unincorporated area and on properties in jurisdictions within and immediately adjacent to Placer County.
Policy 4. E.12:	The County shall encourage project designs that minimize drainage concentrations and impervious coverage and maintain, to the extent feasible, natural site drainage conditions.
Policy 4. E.13:	The County shall require that new development conforms with the applicable programs, policies, recommendations, and plans of the Placer County Flood Control and Water Conservation District.
Policy 4. E.14:	The County shall require projects that have significant impacts on the quantity and quality of surface water runoff to allocate land as necessary for the purpose of detaining post-project flows and/or for the incorporation of mitigation measures for water quality impacts related to urban runoff.
Policy 4. E.15:	The County shall identify and coordinate mitigation measures with responsible agencies for the control of storm sewers, monitoring of discharges, and implementation of measures to control pollutant loads in urban storm water runoff (e.g., California Regional Water Quality Control Board, Placer County Division of Environmental Health, Placer County Department of Public Works, Placer County Flood Control and Water Conservation District).
Policy 4. E.16:	The County shall strive to protect domestic water supply canal systems from contamination resulting from spillage or runoff.
Policy 4. E.17:	The County shall, wherever feasible, require that proponents of new projects encase, or otherwise protect from contamination, domestic water supply canals where they pass through developments with lot sizes of 2.3 acres or less; where subdivision roads are constructed within 100 feet upslope or upstream from canals; and within all commercial, industrial, institutional, and multi-family developments.
Policy 4. E.18:	The County shall require that proponents of new projects fence domestic water supply canals where they pass through development with lot sizes between 2.3 and 4.6 acres, and on a case-by-case basis as determined by the entity responsible for the canal. This fencing shall be installed inside the project property line, and the proponent or subsequent landowner shall be responsible for fence maintenance. Said fencing shall be designed to impede pedestrian trespass of the canal Policy Document Public Facilities and Services area and to impede any dumping of materials into the canal.

Flood Protection

Policies in this section seek to ensure safe, efficient, and environmentally sound means to provide flood control by providing necessary facility improvements, ensuring compliance with sound floodplain management practices, and ensuring compliance with state regulations.

Goal 4.F:	To protect the lives and property of the citizens of Placer County from hazards associated with development in floodplains and manage floodplains for their natural resource values.
Policy 4. F.1:	The County shall require that arterial roadways and expressways, residences, commercial and industrial uses, and emergency facilities be protected, at a minimum, from a 100-year storm event.
Policy 4. F.2:	The County shall recognize floodplains as a potential public resource to be managed and maintained for the public's benefit.

Goal 4.F:	To protect the lives and property of the citizens of Placer County from hazards associated with development in floodplains and manage floodplains for their natural resource values.
Policy 4. F.3:	The County shall continue to work closely with the U.S. Army Corps of Engineers, the resource conservation district, the Federal Emergency Management Agency, the State Department of Water Resources, and the Placer County Flood Control District in defining existing and potential flood problem areas.
Policy 4.F.4:	The County shall require evaluation of potential flood hazards prior to approval of development projects. The County shall require proponents of new development to submit accurate topographic and flow characteristics information and depiction of the 100-year floodplain boundaries under fully-developed, unmitigated runoff conditions.
Policy 4. F.5:	The County shall attempt to maintain natural conditions within the 100-year floodplain of all rivers and streams except under the following circumstances: a. Where work is required to manage and maintain the stream's drainage characteristics and where such work is done in accordance with the Placer County Flood Damage Prevention Ordinance, California Department of Fish and Game regulations, and Clean Water Act provisions administered by the U.S. Army Corps of Engineers; or b. When facilities for the treatment of urban runoff can be located in the floodplain, provided that there is no destruction of riparian vegetation.
Policy 4. F.6:	The County shall continue to coordinate efforts with local, state, and federal agencies to achieve adequate water quality and flood protection.
Policy 4. F.7:	The County shall cooperate with the Placer County Flood Control and Water Conservation District, surrounding jurisdictions, the cities in the County, and other public agencies in planning and implementing regional flood control improvements.
Policy 4. F.8:	The County shall, where possible, view flood waters as a resource to be used for waterfowl habitat, aquifer recharge, fishery enhancement, agricultural water supply, and other suitable uses.
Policy 4. F.9:	The County shall continue to implement floodplain zoning and undertake other actions required to comply with state floodplain requirements, and to maintain the County's eligibility under the Federal Flood Insurance Program.
Policy 4. F.10:	The County shall preserve or enhance the aesthetic qualities of natural drainage courses in their natural or improved state compatible with flood control requirements and economic, environmental, and ecological factors.
Policy 4. F.11:	To the extent that funding is available, the County shall work to solve flood control problems in areas where existing development has encroached into a floodplain.
Policy 4. F.12:	The County shall promote the use of natural or non-structural flood control facilities, including off-stream flood control basins, to preserve and enhance creek corridors.
Policy 4. F.13:	The County shall continue to implement and enforce its Grading Ordinance and Flood Damage Prevention Ordinance.
Policy 4. F.14:	The County shall ensure that new storm drainage systems are designed in conformance with the Placer County Flood Control and Water Conservation District's Stormwater Management Manual and the County's Land Development Manual.

Fire Protection Services

Policies in this section seek to ensure the prompt and efficient provision of fire facility and service needs, ensure adequate funding is available in new development areas, and protect the life and property of residents of and visitors to Placer County.

Goal 4.I:	To protect residents of and visitors to Placer County from injury and loss of life and to protect property and watershed resources from fires.
Policy 4.I.1:	The County shall encourage local fire protection agencies in Placer County to maintain the following minimum fire protection standards (expressed as Insurance Service Organization (ISO) ratings): a. ISO 4 in urban areas;

Goal 4.I:	To protect residents of and visitors to Placer County from injury and loss of life and to protect property and watershed resources from fires.
	b. ISO 6 in suburban areas; and c. ISO 8 in rural areas.
Policy 4.I.2:	The County shall encourage local fire protection agencies in the County to maintain the following standards (expressed as average response times to emergency calls): a. 4 minutes in urban areas; b. 6 minutes in suburban areas; and c. 10 minutes in rural areas.
Policy 4.I.3:	The County shall require new development to develop or fund fire protection facilities, personnel, and operations and maintenance that, at a minimum, maintain the above service level standards.
Policy 4.I.4:	The County shall work with local fire protection agencies to identify key fire loss problems and design appropriate fire safety education programs to reduce fire incidents and losses.
Policy 4.I.5:	The County shall work with local fire protection agencies and implement ordinances to control fire losses and fire protection costs through continued use of automatic fire detection, control, and suppression systems.
Policy 4.I.6:	The County shall continue to promote standardization of operations among fire protection agencies and improvement of fire service levels.
Policy 4.I.7:	The County shall maintain and strengthen automatic aid agreements to maximize efficient use of available resources.
Policy 4.I.8:	The County shall work with local fire protection agencies to maintain a prefire planning program with selected high-risk occupancies reviewed at least annually.
Policy 4.I.9:	The County shall ensure that all proposed developments are reviewed for compliance with fire safety standards by responsible local fire agencies per the Uniform Fire Code and other County and local ordinances.
Policy 4.I.10:	The County shall work with local fire protection agencies to inventory and eliminate structurally unsafe and fire-hazardous housing units that are beyond repair or rehabilitation.
Policy 4.I.11:	The County shall encourage local fire protection agencies to provide and maintain advanced levels of emergency medical services (EMS) to the public.

Recreational and Cultural Resources Element

The Recreational and Cultural Resources Element is concerned with developing and maintaining recreational facilities and opportunities and protecting and enhancing cultural resources for the needs of present and future residents, employees, and visitors to Placer County. Applicable goals and policies are presented below.

Public Recreation and Parks

Policies in this section seek to enhance recreational opportunities in the County by encouraging the further development of public and private recreation lands, and requiring development to help fund additional parks and recreation facilities.

Goal 5.A:	To develop and maintain a system of conveniently-located, properly-designed parks and recreational facilities to serve the needs of present and future residents, employees, and visitors.
Policy 5.A.4:	The County shall consider the use of the following open space areas as passive parks to be applied to the requirement for 5 acres of passive park area for every 1,000 residents: a. Floodways; b. Protected riparian corridors and stream environment zones; c. Protected wildlife corridors;

Goal 5.A:	To develop and maintain a system of conveniently-located, properly-designed parks and recreational facilities to serve the needs of present and future residents, employees, and visitors.
	<ul style="list-style-type: none"> d. Greenways with the potential for trail development; e. Open water (e.g., ponds, lakes, and reservoirs); f. Protected woodland areas; and g. Protected sensitive habitat areas for which interpretive displays are provided (e.g., wetlands and habitat for rare, threatened or endangered species), <p>Buffer areas are not considered as passive park areas if such areas are delineated by setbacks within private property. Where such areas are delineated by public easements or are held as common areas with homeowner/property owner access or public access, they will be considered as passive park areas provided that there are opportunities for passive recreational use.</p>
Policy 5.A.12:	The County shall encourage recreational development that complements the natural features of the area, including the topography, waterways, vegetation, and soil characteristics.

Recreational Trail

Policies in this section seek to develop and enhance a trail system to meet the recreational, transportation, and circular needs of the community.

Goal 5.C:	To develop a system of interconnected hiking, riding, and bicycling trails and paths suitable for active recreation and transportation and circulation.
	<p>The County shall support development of a countywide trail system designed to achieve the following objectives:</p> <ul style="list-style-type: none"> a. Provide safe, pleasant, and convenient travel by foot, horse, or bicycle b. Link residential areas, schools, community buildings, parks, and other community facilities within residential developments (whenever possible, trails should connect to the countywide trail system, regional trails, and the trail or bikeways plans of cities); c. Provide access to recreation areas, major waterways, and vista points; d. Provide for multiple uses (i.e., pedestrian, equestrian, bicycle); e. Use public utility corridors such as power transmission line easements, railroad rights-of-way, irrigation district easements, and roadways; f. Whenever feasible, be designed to separate equestrian trails from cycling paths, and to separate trails from the roadway by the use of curbs, fences, landscape buffering, and/or spatial distance; g. Connect commercial areas, major employment centers, institutional uses, public facilities, and recreational areas with residential areas; and h. Protect sensitive open space and natural resources.
Policy 5.C.1:	
Policy 5.C.2:	The County shall support the integration of public trail facilities into the design of flood control facilities and other public works projects whenever possible.

Cultural Resources

Policies in this section seek to preserve the historical, archeological, paleontological, and cultural resources of the County through development review, acquisition, incentive programs, coordination with other agencies and groups, and other methods.

Goal 5.D:	To identify, protect, and enhance Placer County's important historical, archaeological, paleontological, and cultural sites and their contributing environment.
Policy 5.D.6:	The County shall require that discretionary development projects identify and protect from damage, destruction, and abuse important historical, archaeological, paleontological, and cultural sites and their contributing environment. Such assessments shall be incorporated into a countywide cultural resource data base, to be maintained by the Department of Museums.

Goal 5.D:	To identify, protect, and enhance Placer County's important historical, archaeological, paleontological, and cultural sites and their contributing environment.
Policy 5.D.7:	The County shall require that discretionary development projects are designed to avoid potential impacts to significant paleontological or cultural resources whenever possible. Unavoidable impacts, whenever possible, shall be reduced to a less than significant level and/or shall be mitigated by extracting maximum recoverable data. Determinations of impacts, significance, and mitigation shall be made by qualified archaeological (in consultation with recognized local Native American groups), historical, or paleontological consultants, depending on the type of resource in question.

Natural Resources Element

Goals and policies in the Natural Resources Element seek to protect natural resources in the County while allowing compatible uses where appropriate.

Water Resources

Policies in this section seek to protect and enhance the surface water and groundwater resources in the County. The policies address broad water planning issues, the relationship of land use decisions to water issues, and water quality problems.

Goal 6.A:	To protect and enhance the natural qualities of Placer County's streams, creeks, and groundwater.
Policy 6.A.1:	The County shall require the provision of sensitive habitat buffers which shall, at a minimum, be measured as follows: 100 feet from the centerline of perennial streams, 50 feet from centerline of intermittent streams, and 50 feet from the edge of sensitive habitats to be protected including riparian zones, wetlands, old growth woodlands, and the habitat of rare, threatened or endangered species (see discussion of sensitive habitat buffers in Part I of this Policy Document). Based on more detailed information supplied as a part of the review for a specific project, the County may determine that such setbacks are not applicable in a particular instance or should be modified based on the new information provided. The County may, however, allow exceptions, such as in the following cases: a. Reasonable use of the property would otherwise be denied; b. The location is necessary to avoid or mitigate hazards to the public; c. The location is necessary for the repair of roads, bridges, trails, or similar infrastructure; or d. The location is necessary for the construction of new roads, bridges, trails, or similar infrastructure where the County determines there is no feasible alternative and the project has minimized environmental impacts through project design and infrastructure placement.
Policy 6.A.2:	The County shall require all development in the 100-year floodplain to comply with the provisions of the Placer County Flood Damage Prevention Ordinance.
Policy 6.A.3:	The County shall require development projects proposing to encroach into a creek corridor or creek setback to do one or more of the following, in descending order of desirability: a. Avoid the disturbance of riparian vegetation; b. Replace riparian vegetation (on-site, in-kind); c. Restore another section of creek (in-kind); and/or d. Pay a mitigation fee for restoration elsewhere (e.g., wetland mitigation banking program).
Policy 6.A.4:	Where creek protection is required or proposed, the County should require public and private development to: a. Preserve creek corridors and creek setback areas through easements or dedications. Parcel lines (in the case of a subdivision) or easements (in the case of a subdivision or other development) shall be located to optimize resource protection. If a creek is proposed to be included within an open space parcel or easement, allowed uses and maintenance responsibilities within that parcel or easement should be clearly defined and conditioned prior to map or project approval; b. Designate such easement or dedication areas (as described in a. above) as open space; c. Protect creek corridors and their habitat value by actions such as: 1) providing an adequate

Goal 6.A:	To protect and enhance the natural qualities of Placer County's streams, creeks, and groundwater.
	<p>creek setback, 2) maintaining creek corridors in an essentially natural state, 3) employing creek restoration techniques where restoration is needed to achieve a natural creek corridor, 4) utilizing riparian vegetation within creek corridors, and where possible, within creek setback areas, 5) prohibiting the planting of invasive, non-native plants (such as vinca major and eucalyptus) within creek corridors or creek setbacks, and 6) avoiding tree removal within creek corridors;</p> <p>d. Provide recreation and public access near creeks consistent with other General Plan policies;</p> <p>e. Use design, construction, and maintenance techniques that ensure development near a creek will not cause or worsen natural hazards (such as erosion, sedimentation, flooding, or water pollution) and will include erosion and sediment control practices such as: 1) turbidity screens and other management practices, which shall be used as necessary to minimize siltation, sedimentation, and erosion, and shall be left in place until disturbed areas are stabilized with permanent vegetation that will prevent the transport of sediment off site, and 2) temporary vegetation sufficient to stabilize disturbed areas; and</p> <p>f. Provide for long-term creek corridor maintenance by providing a guaranteed financial commitment to the County which accounts for all anticipated maintenance activities.</p>
Policy 6.A.5:	The County shall continue to require the use of feasible and practical best management practices (BMPs) to protect streams from the adverse effects of construction activities and urban runoff and to encourage the use of BMPs for agricultural activities.
Policy 6.A.6:	The County shall require that natural watercourses are integrated into new development in such a way that they are accessible to the public and provide a positive visual element.
Policy 6.A.7:	The County shall discourage grading activities during the rainy season, unless adequately mitigated, to avoid sedimentation of creeks and damage to riparian habitat.
Policy 6.A.8:	Where the stream environment zone has previously been modified by channelization, fill, or other human activity, the County shall require project proponents to restore such areas by means of landscaping, revegetation, or similar stabilization techniques as a part of development activities.
Policy 6.A.9:	The County shall require that newly-created parcels include adequate space outside of watercourses' setback areas to ensure that property owners will not place improvements (e.g., pools, patios, and appurtenant structures) within areas that require protection.
Policy 6.A.10:	<p>The County shall protect groundwater resources from contamination and further overdraft by pursuing the following efforts:</p> <ul style="list-style-type: none"> a. Identifying and controlling sources of potential contamination; b. Protecting important groundwater recharge areas; c. Encouraging the use of surface water to supply major municipal and industrial consumptive demands; d. Encouraging the use of treated wastewater for groundwater recharge; and e. Supporting major consumptive use of groundwater aquifer(s) in the western part of the County only where it can be demonstrated that this use does not exceed safe yield and is appropriately balanced with surface water supply to the same area.
Policy 6.A.11:	<p>Open space located in watersheds which serve reservoirs is important to the adequate performance of those reservoirs for their intended purposes and should be preserved and protected. The watershed is defined as those lands draining into a reservoir and having an immediate effect upon the quality of water within that reservoir. Those lands located within the watershed and within 5,000 feet of the reservoir shall be considered as having an immediate effect. Following are key watersheds labeled "immediate," because of their current domestic usage and proximity to urban areas and "future," because of current non-domestic usage and/or distance from urban areas.</p> <p>Immediate: Folsom Lake Watershed, Combie Lake Watershed, Rock Creek Reservoir, Rollins Lake, Camp Far West Reservoir.</p> <p>Future: Sugarpine Reservoir, Lake Spaulding, Auburn Lake French Meadows Reservoir, Hell Hole Reservoir, and Garden Bar Reservoir.</p>
Policy 6.A.12:	The County shall encourage the protection of floodplain lands and where appropriate, acquire public easements for purposes of flood protection, public safety, wildlife preservation, groundwater recharge, access, and recreation.

Wetland and Riparian Areas

Policies in this section seek to protect riparian and wetland habitats in the County while allowing compatible uses where appropriate.

Goal 6.B:	To protect wetland communities and related riparian areas throughout Placer County as valuable resources.
Policy 6.B.1:	The County shall support the “no net loss” policy for wetland areas regulated by the U.S. Army Corps of Engineers, the U.S. Fish and Wildlife Service, and the California Department of Fish and Game. Coordination with these agencies at all levels of project review shall continue to ensure that appropriate mitigation measures and the concerns of these agencies are adequately addressed.
Policy 6.B.2:	The County shall require new development to mitigate wetland loss in both regulated and nonregulated wetlands to achieve “no net loss” through any combination of the following, in descending order of desirability: (1) avoidance; (2) where avoidance is not possible, minimization of impacts on the resource; or (3) compensation, including use of a mitigation banking program that provides the opportunity to mitigate impacts to rare, threatened, and endangered species and/or the habitat which supports these species in wetland and riparian areas.
Policy 6.B.3:	The County shall discourage direct runoff of pollutants and siltation into wetland areas from outfalls serving nearby urban development. Development shall be designed in such a manner that pollutants and siltation will not significantly adversely affect the value or function of wetlands.
Policy 6.B.4:	The County shall strive to identify and conserve remaining upland habitat areas adjacent to wetlands and riparian areas that are critical to the survival and nesting of wetland and riparian species.
Policy 6.B.5:	The County shall require development that may affect a wetland to employ avoidance, minimization, and/or compensatory mitigation techniques. In evaluating the level of compensation to be required with respect to any given project: (a) on-site mitigation shall be preferred to off-site, and in-kind mitigation shall be preferred to out-of-kind; (b) functional replacement ratios may vary to the extent necessary to incorporate a margin of safety reflecting the expected degree of success associated with the mitigation plan; and (c) acreage replacement ratios may vary depending on the relative functions and values of those wetlands being lost and those being supplied, including compensation for temporal losses. The County shall continue to implement and refine criteria for determining when an alteration to a wetland is considered a less-than-significant impact under CEQA.

Fish and Wildlife Habitat

Policies in this section seek to protect and enhance habitats that support fish and wildlife species within the County.

Goal 6.C:	To protect, restore, and enhance habitats that support fish and wildlife species so as to maintain populations at viable levels.
Policy 6.C.1:	<p>The County shall identify and protect significant ecological resource areas and other unique wildlife habitats critical to protecting and sustaining wildlife populations. Significant ecological resource areas include the following:</p> <ul style="list-style-type: none">a. Wetland areas including vernal pools;b. Stream environment zones;c. Any habitat for rare, threatened or endangered animals or plants;d. Critical deer winter ranges (winter and summer), migratory routes and fawning habitat;e. Large areas of non-fragmented natural habitat, including Blue Oak Woodlands, Valley Foothill Riparian, and vernal pool habitat;f. Identifiable wildlife movement zones, including but not limited to, non-fragmented stream environment zones, avian and mammalian migratory routes, and known concentration areas of waterfowl within the Pacific Flyway; andg. Important spawning areas for anadromous fish.

Goal 6.C:	To protect, restore, and enhance habitats that support fish and wildlife species so as to maintain populations at viable levels.
Policy 6.C.2:	The County shall require development in areas known to have particular value for wildlife to be carefully planned and, where possible, located so that the reasonable value of the habitat for wildlife is maintained.
Policy 6.C.3:	The County shall encourage the control of residual pesticides to prevent potential damage to water quality, vegetation, and wildlife.
Policy 6.C.4:	The County shall encourage private landowners to adopt sound wildlife habitat management practices, as recommended by California Department of Fish and Game officials, the U.S. Fish and Wildlife Service, and the Placer County Resource Conservation District.
Policy 6.C.5:	The County shall require mitigation for development projects where isolated segments of stream habitat are unavoidably altered. Such impacts should be mitigated on-site with in-kind habitat replacement or elsewhere in the stream system through stream or riparian habitat restoration work.
Policy 6.C.6:	The County shall support preservation of the habitats of rare, threatened, endangered, and/or other special status species. Federal and state agencies, as well as other resource conservation organizations, shall be encouraged to acquire and manage endangered species' habitats.
Policy 6.C.7:	The County shall support the maintenance of suitable habitats for all indigenous species of wildlife without preference to game or non-game species, through maintenance of habitat diversity.
Policy 6.C.8:	The County shall support the preservation or re-establishment of fisheries in the rivers and streams within the County, whenever possible.
Policy 6.C.9:	The County shall require new private or public developments to preserve and enhance existing native riparian habitat unless public safety concerns require removal of habitat for flood control or other public purposes. In cases where new private or public development results in modification or destruction of riparian habitat for purposes of flood control, the developers shall be responsible for acquiring, restoring, and enhancing at least an equivalent amount of like habitat within or near the project area.
Policy 6.C.10:	The County will use the California Wildlife Habitat Relationships (WHR) system as a standard descriptive tool and guide for environmental assessment in the absence of a more detailed site-specific system.
Policy 6.C.11:	<p>Prior to approval of discretionary development permits involving parcels within a significant ecological resource area, the County shall require, as part of the environmental review process, a biotic resources evaluation of the sites by a wildlife biologist; the evaluation shall be based upon field reconnaissance performed at the appropriate time of year to determine the presence or absence of rare, threatened, or endangered species of plants or animals. Such evaluation will consider the potential for significant impact on these resources and will identify feasible measures to mitigate such impacts or indicate why mitigation is not feasible. In approving any such discretionary development permit, the decision making body shall determine the feasibility of the identified mitigation measures. Significant ecological resource areas shall, at a minimum, include the following:</p> <ul style="list-style-type: none"> a. Wetland areas including vernal pools; b. Stream environment zones; c. Any habitat for rare, threatened or endangered animals or plants; d. Critical deer winter ranges (winter and summer), migratory routes and fawning habitat; e. Large areas of non-fragmented natural habitat, including Blue Oak Woodlands, Valley Foothill Riparian, vernal pool habitat; f. Identifiable wildlife movement zones, including but not limited to, non-fragmented stream environment zones, avian and mammalian migratory routes, and known concentration areas; of waterfowl within the Pacific Flyway; and g. Important spawning areas for anadromous fish.
Policy 6.C.12:	The County shall cooperate with, encourage, and support the plans of other public agencies to acquire fee title or conservation easements to privately-owned lands in order to preserve important wildlife corridors and to provide habitat protection of California Species of Concern and state or federally listed rare, threatened, or endangered plant and animal species.
Policy 6.C.13:	The County shall support and cooperate with efforts of other local, state, and federal agencies and private entities engaged in the preservation and protection of significant biological resources

Goal 6.C:	To protect, restore, and enhance habitats that support fish and wildlife species so as to maintain populations at viable levels.
	from incompatible land uses and development. Significant biological resources include endangered, threatened, or rare species and their habitats, wetland habitats, wildlife migration corridors, and locally-important species/communities.
Policy 6.C.14:	The County shall support the management efforts of the California Department of Fish and Game to maintain and enhance the productivity of important fish and game species (such as the Blue Canyon and Loyalton Truckee deer herds) by protecting identified critical habitat for these species from incompatible suburban, rural residential, or recreational development.

Vegetation

Policies in this section seek to protect native vegetation resources within the County.

Goal 6.D:	To preserve and protect the valuable vegetation resources of Placer County.
Policy 6.D.1:	The County shall encourage landowners and developers to preserve the integrity of existing terrain and natural vegetation in visually-sensitive areas such as hillsides, ridges, and along important transportation corridors.
Policy 6.D.2:	The County shall require developers to use native and compatible non-native species, especially drought-resistant species, to the extent possible in fulfilling landscaping requirements imposed as conditions of discretionary permits or for project mitigation.
Policy 6.D.7:	The County shall support the management of wetland and riparian plant communities for passive recreation, groundwater recharge, nutrient catchment, and wildlife habitats. Such communities shall be restored or expanded, where possible.
Policy 6.D.9:	The County shall require that development on hillsides be limited to maintain valuable natural vegetation, especially forests and open grasslands, and to control erosion.
Policy 6.D.11:	The County shall support the continued use of prescribed burning to mimic the effects of natural fires to reduce fuel volumes and associated fire hazard to human residents and to enhance the health of biotic communities.
Policy 6.D.13:	The County shall support the preservation of native trees and the use of native, drought-tolerant plant materials in all revegetation/landscaping projects.

Open Space for the Preservation of Natural Resources

Policies in this section are concerned with protecting and preserving open space areas to promote the preservation of natural resources within the County.

Goal 6.E:	To preserve and enhance open space lands to maintain the natural resources of the county.
Policy 6.E.1:	The County shall support the preservation and enhancement of natural land forms, natural vegetation, and natural resources as open space to the maximum extent feasible. The County shall permanently protect, as open space, areas of natural resource value, including wetlands preserves, riparian corridors, woodlands, and floodplains.
Policy 6.E.2:	The County shall require that new development be designed and constructed to preserve the following types of areas and features as open space to the maximum extent feasible: <ul style="list-style-type: none"> a. High erosion hazard areas; b. Scenic and trail corridors; c. Streams, streamside vegetation; d. Wetlands; e. Other significant stands of vegetation; f. Wildlife corridors; and g. Any areas of special ecological significance.

Agricultural and Forestry Resources

The Agricultural and Forestry Resources Element focuses on policies that provide for the long-term conservation and use of agricultural and forest resources and enhance the economic vitality within the County.

Agricultural Land Use

Policies in this section are concerned with protecting and preserving agricultural lands within the County.

Goal 7.A:	To provide for the long-term conservation and use of agriculturally-designated lands.
Policy 7.A.4:	The County shall provide protection from flooding for agricultural and related activities from flooding.

Agricultural Water

Policies in this section are concerned with ensuring adequate water supply for the agricultural industry.

Goal 7.D:	To maximize the productivity of Placer County's agriculture uses by ensuring adequate supplies of water.
Policy 7.D.2:	The County shall encourage water conservation by farmers. To this end, the County shall, through the Agricultural Commissioner and U.C. Cooperative Extension, continue to provide information on irrigation methods and best management practices. The County shall also support conservation efforts of the California Farm Bureau, resource conservation districts, Soil Conservation Service, and irrigation districts.
Policy 7.D.3:	The County should participate with cities and special districts in establishing programs for the agricultural re-use of treated wastewater in a manner that would be economically beneficial to agriculture.
Policy 7.D.5:	The County will work with local irrigation districts to preserve local water rights to ensure that water saved through conservation may be stored and used locally, rather than appropriated and used outside of Placer County.
Policy 7.D.6:	The County shall encourage the use of reclaimed water where appropriate for agricultural production.

Forest Resources

Policies in this section are concerned with conserving and sustaining Placer County's forest resources through implementation of sound timber management practices.

Goal 7.E:	To conserve Placer County's forest resources, enhance the quality and diversity of forest ecosystems, reduce conflicts between forestry and other uses, and encourage a sustained yield of forest products.
Policy 7.E.2:	The County shall discourage development that conflicts with timberland management.
Policy 7.D.5:	The County shall review all proposed timber harvest plans (THPs) and shall request that the California Department of Forestry and Fire Protection (CAL FIRE) amend THPs to address public safety concerns, such as requiring alternate haul routes if use of proposed haul routes would jeopardize public health and safety or result in damage to public or private roads.

Placer County Ordinances

The Placer County General Plan provides policy direction for land use, development, open space protection, and environmental quality; however, this policy direction must be carried out through numerous ordinances, programs, and agreements. The following ordinances are among the most important tools for implementing the General Plan and/or are critical to the mitigation of hazards identified in this plan.

Emergency Organization (Chapter 2, Article 2.88)

The declared purpose of this article is to provide for the preparation and carrying out of plans for the protection of persons and property within the County in the event of an emergency; the direction of the emergency organization; and the coordination of the emergency functions of the County with all other public agencies, corporations, organizations, and affected private persons.

Fire Prevention (Chapter 9, Article 9.32)

Part 3, Fire Hazards

This fire hazards ordinance requires all structures to maintain a fire break or clearing for a distance of 30 feet from the structure and keep the roofs free from all flammable debris. This part also sets requirements for burning permits, smoking restrictions in fire danger areas, and for the use and possession of fireworks.

Part 4, Hazardous Vegetation Abatement on Unimproved Parcels

This Fire Prevention ordinance applies to areas defined as the North Tahoe Fire Protection District, Alpine Springs County Water District, Squaw Valley Public Service District and Northstar Community Services District.

The Placer County BOS supports the improved parcel defensible space obligations found in Public Resources Code (PRC) 4291. PRC 4291 does not address hazardous vegetation abatement on unimproved parcels and the potential impact that hazardous vegetation on an unimproved parcel could have on an adjacent improved parcel. This part extends and supplements state law to ensure defensible space activities are accomplished on unimproved parcels adjacent to improved parcels and along roadways and fire access easements so that land owners benefit from the application of PRC 4291 on unimproved parcels.

Drainage of Water, Obstructing Natural Watercourse, Causing Flooding or Damage to County Highway Prohibited (Chapter 12, Article 12.12)

This article makes unlawful the draining of water from private land onto a public highway which results in flooding or damage to the highway. Also prohibited is obstruction of a natural watercourse so as to cause interference with, or damage or hazard to, public highways.

Avalanche Management Areas (Chapter 12, Article 12.40)

This article identifies potential avalanche hazard areas (PAHA) in order to give notice to the public of identified PAHAs; to minimize health and safety hazards, disruption of commerce, and extraordinary public expenditures; and to detail proper siting, design, and construction safeguards for constructing in PAHAs.

Water Conservation Requirements (Chapter 13, Article 13.04)

This article sets forth water conservation requirements applicable to all new and existing construction in the portion of Placer County lying east of the crest of the Sierra Nevada Range.

Dry Creek Watershed Drainage Improvement Zone (Chapter 15, Article 15.32)

This article specific to the Dry Creek Watershed area supplements existing County policies of requiring on-, and off-site drainage improvements to accommodate increased runoff resulting from new development and the expansion of existing development. This article establishes a drainage improvement zone for the Dry Creek watershed area. It requires the payment of specified fees and annual assessments as a condition of new development and the expansion of existing development within the watershed area for the installation and maintenance of roadway drainage and stormwater drainage improvements.

Development Fees for Fire Protection (Chapter 15, Article 15.36)

The purpose of this article is to authorize the collection of development impact mitigation fees in any unincorporated area of Placer County to ensure the provision of the capital facilities necessary to maintain current levels of fire protection services necessitated by new development.

Grading, Erosion, and Sediment Control (Chapter 15, Article 15.48)

The purpose of this article is to regulate grading on property within the unincorporated area of Placer County to safeguard life, limb, health, property and public welfare; to avoid pollution of watercourses with hazardous materials, nutrients, sediments, or other earthen materials generated on or caused by surface runoff on or across the permit area; and to ensure that the intended use of a graded site is consistent with the Placer County general plan, any specific plans adopted thereto and applicable Placer County ordinances including the zoning ordinance, flood damage prevention ordinance, (Article 15.52) environmental review ordinance (Chapter 18 Placer County Code) and applicable chapters of the California Building Code.

Flood Damage Prevention Regulations (Chapter 15, Article 15.528)

It is the purpose of this article to promote public health, safety, and general welfare, and to minimize public and private losses due to flood conditions in specific areas by provisions designed to:

- A. Protect human life and health;
- B. Minimize expenditure of public money for costly flood control projects;

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- C. Minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public;
 - D. Minimize prolonged business interruptions;
 - E. Minimize damage to public facilities and utilities such as water and gas mains, electric, telephone and sewer lines, streets and bridges located in areas of special flood hazard;
 - F. Help maintain a stable tax base by providing for the sound use and development of areas of special flood hazard so as to minimize future flood blight areas;
 - G. Insure that potential buyers are notified that property is in an area of special flood hazard; and
 - H. Insure that those who occupy the areas of special flood hazard assume responsibility for their actions (Prior code § 4.1310.30).

In order to accomplish its purpose, this article includes methods and provisions for:

- A. Restricting or prohibiting uses which are dangerous to health, safety, and property due to water or erosion hazards, or which result in increasing damage in erosion, flood heights, or flood velocities;
- B. Requiring that uses vulnerable to floods, including facilities which serve such uses, be protected against flood damage at the time of initial construction;
- C. Controlling the alteration of natural floodplains, stream channels, and natural protective barriers, which help accommodate or channel floodwaters;
- D. Controlling fill, grading, dredging, and other development which may increase flood damage; and
- E. Preventing or regulating the construction of flood barriers which will unnaturally divert floodwaters or may increase flood hazards in other areas (Prior code § 4.1310.40).

Of specific interest are the construction requirements for elevation and flood-proofing. Specifically, these require new construction and substantial improvements to have the lowest floor, including basement, elevated a minimum of base flood elevation plus one foot. It is further recommended that the finish floor be a minimum of two feet above the base flood elevation.

Subdivisions: Design Standards and Improvements (Chapter 16, Article 16.08)

Placer County's subdivision ordinance regulates the design and improvement of land divisions and the dedication of public improvements needed in connection with land divisions. The ordinance includes provisions for the following hazard-related issues: erosion control, flooding and drainage, water supply, and fire suppression.

Zoning Ordinance (Chapter 17)

The purpose of the zoning ordinance is to classify and regulate the best use of buildings, structures, and land in the unincorporated area of Placer County in a manner consistent with the Placer County General Plan. This ordinance is designed to ensure management of land use in a manner that will assure the orderly development and beneficial use of the unincorporated areas of Placer County for residential, commercial, industrial, agricultural, forestry, open space and other purposes. To further these objectives, this ordinance includes requirements for reducing hazards to the public resulting from the inappropriate location, use or design of buildings and land uses in relation to natural and built hazards. It addresses setbacks, buffers, natural resources protection and drainage. For example, the flood hazard combining district identifies areas subject to the 100-year floodplain and requires that new development in this combining zone abide by standards within the Placer County Flood Damage Prevention Ordinance (Article 15.52). Likewise, the geological hazard combining district was established to identify areas where geological and soil conditions may present hazards to life or property. All land use permit applications for projects located within this district require a report describing all geological and avalanche hazards in the region proposed for development.

Building and Construction Codes Adopted (Title 15, Chapter 15.04)

This article adopts the International Building Code 2006 edition as adopted in The California Building Standards Code (The 2007 California Building Code) which adopts those standards with state agency modification within the scope of their authority.

This article adopts the International Fire Code 2006 edition as adopted in The California Building Standards Code (The 2007 California Fire Code) which adopts those standards with state agency modification within the scope of their authority.

California Department of Forestry State Responsibility Area Fire Safe Regulations of the County (Title 15, Chapter 15.60)

This chapter provides for basic emergency access, perimeter wildfire protection measures, signing and building numbering, private water supply reserves for emergency fire use, and vegetation modification.

Development requirements in this chapter address setbacks for structures, road improvements, road width, cul-de-sacs and dead-end roads, one-way roads, driveways, gates, road signs, building signs, flammable vegetation and fuels, water supply, and hydrant locations.

Placer County Plans/Studies

Stormwater Management Plan, 2003-2008 (Revised March 1, 2004).

This comprehensive plan is designed to ultimately reduce pollution in stormwater runoff in compliance with the County's National Pollutant Discharge Elimination System (NPDES) stormwater permit within portions of western Placer County (excludes Foresthill and Colfax).

The plan includes processes for accomplishing the goals of minimizing construction site runoff as well as post-construction stormwater management in newly developed and redeveloped areas.

Placer County Flood Control and Water Conservation District's Stormwater Management Manual, 1990.

The primary purpose of the District is to protect lives and property from the effects of flooding through comprehensive, coordinated flood prevention planning, using consistent standards to evaluate flood risk, and by implementing flood control measures such as requiring new development to construct detention basins and operation and management of a flood warning system. This manual presents policy, guidelines, and specific criteria for the development and management of natural resources, facilities and infrastructure for stormwater management. Flooding is recognized as the primary problem associated with development occurring adjacent to streams and the consequent increase in stormwater runoff. The plan refers to the Basic Drainage Law Requirements which include four general principles that apply to development projects in general. The principles dictate what upstream and downstream property owners must do to minimize alteration to existing, functional drainage patterns in the region of their property.

Watershed Management Plans

A watershed management plan is a document that guides efforts to control pollution, manage stormwater, and protect and improve local streams and the uplands that surround them. These plans also provide collaborative agreement among government, other local stakeholders, and citizens during the planning process. Placer County has been involved in the development of a number of comprehensive watershed management plans. These watershed plans guide the County and other stakeholders in protecting, managing, and improving environmental resources and habitat. Watershed Management Plans in Placer County include:

- Dry Creek Coordinated Management Plan;
- Auburn Ravine/Coon Creek Ecosystem Restoration Plan;
- Pleasant Grove/Curry Creek Ecosystem Restoration Plan;
- Auburn Ravine Restoration Plan;
- Rock Creek Restoration Plan; and
- Squaw Creek Restoration Plan.

Auburn/Bowman Community Plan, Hydrology Study, JMM 1992

This study covers the Auburn/Bowman area and includes flood mitigation recommendations.

Dry Creek Watershed Flood Control Plan, JMM 1992

This plan covers the Dry Creek Watershed area and includes flood mitigation recommendations.

Placer County Conservation Plan (PCCP)

As part of the Placer Legacy Program, County staff initiated the preparation of a Natural Community Conservation Plan and Habitat Conservation Plan to comply with the State and

Federal Endangered Species Act, and to programmatically comply with the Federal Clean Water Act related to wetlands. This effort, now referred to as the Placer County Conservation Plan (PCCP), is proceeding for the first phase of the PCCP covering western Placer County.

The PCCP is intended to address the impacts associated primarily with unincorporated growth in west Placer and growth associated with the build out of Lincoln's updated General Plan. Development in western Placer County will require the preservation of approximately 54,300 acres of land between now and 2050.

Local Emergency Operations Plan (February 2004)

The Emergency Operations Plan, including the Placer Operational Area, includes information on hazards facing the County and associated response and recovery information.

Community Plans

Placer County has developed numerous community plans. The following are available online:

- Auburn/Bowman Community Plan
- Carnelian Bay Community Plan
- Dry Creek/West Placer Community Plan
- Foresthill Divide Community Plan Update
- Granite Bay Community Plan
- Horseshoe Bay/Penryn Community Plan
- Kings Beach Community Plan
- Martis Valley Community Plan
- Meadow Vista Community Plan
- Placer County General Plan.
- Sunset Industrial Plan.

Watershed Restoration Projects

Watershed planning and restoration includes all of the activities related to preserving, protecting and restoring the streams, wetlands, forests and other natural resources within a watershed.

The Natural Resources Division is managing a number of grants that are affiliated with the implementation of the Placer Legacy Program and watershed restoration projects. The majority of the funding applies to watershed-based planning efforts associated with CALFED Bay-Delta Program (to restore the ecological health and improve water management for beneficial uses in the Bay-Delta System) or Proposition 204 (The Safe, Clean, Water Supply Act of 1996). Specific restoration projects include:

- Auburn Ravine Restoration Plan;
- Rock Creek Restoration Plan; and
- Squaw Creek Restoration Plan.

Greenway Plans

Placer County has two Greenway plans under development – one in the Dry Creek watershed in south Placer County, the second along the Truckee River in the Sierra. Greenways are corridors of linear open space established for wildlife habitat and open space conservation and/or recreation. Greenways may be held on public land, voluntarily retained on private land, or conserved through public-private partnerships.

The plans signal the start of a multi-year effort to create new public recreational opportunities, increase the mobility of cyclists, walkers, and joggers, and enrich the lives of Placer's residents and visitors. The plans are:

- Dry Creek Greenway Regional Vision
- Truckee River Corridor Access Plan

County Departments/Agencies

Office of Emergency Services

The Placer County Operational Area Office of Emergency Services (OES) is the emergency management agency for Placer County. Placer County OES is headquartered in Auburn, the County seat. The office provides service countywide, in cooperation with cities and special districts, such as the fire department and law agencies.

OES' responsibilities include:

- Directing the County's overall response to natural and human-caused disasters;
- Assigning emergency responsibilities to the various departments of the County;
- Coordinating the response and recovery efforts of governmental and non-governmental agencies during disasters;
- In the case of a possible terrorist attack, working with the Placer County Health Officer and the Placer County Sheriff's Office to respond and protect public health and safety;
- Managing the County's Emergency Operations Center; and
- Conducting emergency drills and simulations.

OES also provides updated emergency-related information to the public on the County's website. This site provides weather and flooding information, which includes guidance on protecting your home from winter storms, where to get sandbags, preparation for what to do before, during and after floods, etc. Also provided are links to national, state, and local information on fires, earthquakes, highway and road information, and general federal and state emergency information.

Engineering & Surveying Department

The Engineering & Surveying Department (ESD) provides engineering and surveying review/oversight for private development projects within the unincorporated areas of Placer

County. This includes engineering review of development applications in concert with planning entitlements, review of civil site improvement plans for infrastructure design, inspection of constructed infrastructure, and mapping services associated with land divisions and records of survey. ESD also provides project facilitation, and floodplain management, issues grading permits, investigates grading complaints, and assigns road names and addresses.

Building Department

To help assure building safety, the Building Department works with local residents, builders, and developers to be sure residential and commercial building in the unincorporated area of the County meets County building codes. The department:

- Issues building permits for commercial and residential building;
- Conducts building plan checks and inspections, including a third-party plan review option; and
- Assists the public with building concerns, and code enforcement issues.

Placer County Planning Department

The Placer County Planning Department provides information on land development, zoning, reviews and makes recommendations on land development applications, helps the Board of Supervisors and Planning Commission plan for growth by providing professional and technical expertise, leads the preparation of Community Plans as well as Countywide plans which set the guidelines for future growth, and enforces Chapter 17 (Zoning Ordinance) of the County Code.

Placer County Department of Public Works

The Department of Public Works provides a wide range of public services with offices located in Auburn and North Lake Tahoe. Maintenance crew corporation yards are located in the North Lake Tahoe, Colfax, Foresthill, Lincoln, Auburn, and Loomis areas. The Department of Public Works is comprised of four separate divisions: Transportation, Fleet Services, Road Maintenance, and Administration.

Placer County Facility Services Department, Environmental Engineering Division

The Environmental Engineering Division maintains and oversees wastewater and solid waste issues for the County. The Division maintains sewer lines, cleans sewers, and operates and maintains wastewater treatment plants (WWTPs) operated by the County. The WWTPs fall under the regulatory oversight of the State and Regional Water boards. Facility permits limit the amount of wastewater processed and quality of treated discharged water.

The department is also responsible for floodplain administration and administers the National Flood Insurance Program (NFIP) for unincorporated areas of the County. The NFIP is a FEMA program that makes flood insurance available to communities that have enacted local ordinances restricting development within the 100-year floodplain.

The Division also administers the countywide solid waste management program. The facilities fall under the regulatory oversight of the California Integrated Waste Management Board (CIWMB) and the State and Regional Water Boards. In a disaster, the CIWMB permitting regulations allow for an Emergency Waivers of Standards as allowed under Title 14, California Code of Regulations (14 CCR), Division 7, Chapter 3, Article 3, Section 17210 et seq. Specifically, the waiver enables an operator of an existing permitted solid waste facility to accept disaster debris and other non-hazardous wastes, in a manner not consistent with the terms and conditions of the relevant solid waste facility permit, during the recovery phase of a state of emergency or local emergency. Under emergency conditions, the normal processing and disposal options may not be feasible or sufficient to handle the overwhelming amount of debris left after a disaster.

Other County Associations/Groups

American River Watershed Group

This organization focuses on natural resource management issues in the North and Middle Forks of the American River, including issues associated with safety of life and property, water quality, wildland fire management, and education.

Lake Tahoe Regional Fire Chiefs' Association

Similar to the Western Placer County Fire Chiefs' Association, this association is comprised of fire chiefs primarily located in the Lake Tahoe area.

Mosquito Abatement District

The Placer Mosquito Abatement District covers the western part of the County, which extends from Newcastle to the county lines of Sacramento, Sutter, and Yuba. In spring of 2000, Measure M was passed within western Placer County to fund the Placer Mosquito Abatement District, which was originally formed on June 18, 1996. In 2004, voters approved extending the Placer County Mosquito Abatement District to cover the entire County. The District provides information on facts about West Nile Virus and measures that can be taken to minimize contact with mosquitoes. Additionally, Placer County formed a WNV Task Force. Over the last year, the Task Force has planned surveillance and abatement activities throughout the County; mapped many of the standing water sources throughout the County; conducted surveillance and abatement services; and provided public information and conducted public education in the County.

North Fork American River Watershed Coordination Group

The California Department of Conservation granted funds to the Placer County Resource Conservation District to be used for Watershed Coordination for three years until 2007). The North Fork American River Watershed actually includes both the North and Middle Forks of the American River. The objectives of the group are to coordinate collaboration between all stakeholders; implement education and outreach with landowners, businesses, and agencies;

facilitate implementation of water quality improvements and ecosystem restoration; inform and educate stakeholders on water quality issues; and implement a water quality data collection program.

Placer County Fire Safe Alliance

The Placer County Fire Safe Alliance began 12 years ago and includes members from federal, state, and local fire and non-fire agencies, the several fire safe councils in the County, and the Resource Conservation District. In 2001, the Alliance became a countywide organization and switched from an information-sharing group to an action-oriented organization with regard to wildfire safety. Various programs and valuable information are offered to the public to help residents learn how to protect their property from fires. The Alliance and its partners have implemented many fire safe projects in the County, including the Placer County Chipper Program, defensible space inspections, and vegetation reduction projects.

Placer County Flood Control and Water Conservation District

Flood control services in Placer County are provided by the Placer County Flood Control and Water Conservation District, which was established in 1984 as a special district to address regional flood control issues arising with growth. The District has developed a County flood warning system, a Flood Response Handbook (updated annually), and also sets standards for development and assists the County's OES during flood events. The District pursues planning and implementation of regional detention and retention flood control facilities in partnership with local member agencies. The District also administers an annual storm channel maintenance program in unincorporated portions of the County.

Placer County Resource Conservation District (RCD)

The Placer County Resource Conservation District (RCD) was founded in 1947. It is dedicated to:

- Identifying natural resource management and conservation issues;
- Providing education and technical assistance or direction to private landowners and local agencies/organizations; and
- Inspiring and mobilizing public conservation awareness and involvement for implementing programs and plans (including wildfire risk reduction) to conserve and enhance the natural resources within the County.

The RCD works with farmers and ranchers on agricultural issues. In addition, CAL FIRE partners with the RCD for definition of agency Vegetation Management Plans.

Western Placer County Fire Chief's Association

The Western Placer County Fire Chiefs' Association is comprised of fire chiefs primarily located in the Western portion of the County. A primary purpose of the group is to develop the administrative abilities of fire chiefs of Placer County, and to act as an advisory association to all

governmental agencies as it pertains to fire protection and emergency services in Placer County. As part of their efforts, they provide aid in the training, preparation, and coordination of Placer County's Emergency Response Departments prior to, during, and after a catastrophic emergency.

Tahoe Regional Planning Agency

Lake Tahoe is a magnificent blue body of water that is threatened by environmental degradation. Its famed clarity has steadily been declining due to human impact. The Tahoe Regional Planning Agency (TRPA) is charged with protecting this national treasure for the benefit of current and future generations. Its vision is to have a lake and environment that is clean, healthy, and sustainable for the community and future generations. TRPA core values include environmental protection, public service and professionalism, teamwork and collaboration, communication, and management. TRPA worked with the Nevada Fire Safe Council, University of Nevada Cooperative Extension, and local fire districts to produce a guide to creating defensible space in Lake Tahoe's fragile environment.

Placer County Planning Commission

The Planning Commission is the principal advisory body to the Board of Supervisors on planning and land use matters, and regulations related to planning, land use, and long range plans for development. There are seven planning commissioners appointed by the Board of Supervisors. Five commissioners represent the five supervisorial districts and two at-large commissioners, one representing the County east of the Sierra crest, and one representing the County west of the crest, also serve on the commission.

Community Development Resource Agency

The Community Development Resource Agency (CDRA) is the umbrella agency which includes the Planning, Building, and Engineering & Surveying Departments, as well as Environmental Coordination Services. CDRA also coordinates work with Environmental Health, Public Works, the Air Pollution Control District, and Redevelopment. There is also a CDRA office in the Tahoe City area.

CDRA is the first stop for land development projects of all sizes, from a single-family home to a large development. An overall process flowchart (pdf and Word 2003 formats) is available, and additional resources can be found on each of the above department's web pages. The Agency's charter is to improve the review process for development projects proposed in unincorporated areas.

Agricultural Commissioner

Agriculture has always played an important part in Placer County's economic success and colorful history. The Board of Supervisors continues to support and encourage agriculture in the County with the Right To Farm ordinance and the Placer Legacy Open Space and Agricultural Conservation Project. The Agriculture Department responsibilities include

-
- Performing agricultural and pesticide inspections;
 - Certifying weighing and measuring devices for consumer protection;
 - Assisting in predatory animal control; and
 - Helping farmers maintain healthy crops and livestock.

Special Districts

There are numerous special districts that provide a variety of public services in Placer County. Special districts can provide one or more types of public services, facilities, or infrastructure within a prescribed boundary, and they play an important role in growth management because the availability of their services can encourage or discourage new development. Special districts can tax the properties within their boundaries to pay for the services they provide. Monthly fees may also be assessed. Some of the special districts that provide mitigation-related services in Placer County are presented below.

Placer County Fire Protection Districts

Fire protection districts provide a variety of services, which may include fire protection, rescue, emergency medical, hazardous material emergency response, and ambulance services.

- **NEED LIST**

Placer County Irrigation Districts

Irrigation districts provide water for irrigation to users within their boundaries. They may also use water under their control for other beneficial purposes and provide flood protection measures.

- **NEED LIST**

Placer County Drainage Districts

Drainage districts control storm and other waste waters within a district's boundaries, protect property and infrastructure within a district from damage by storm or waste waters, and conserve storm and waste waters for beneficial purposes.

- **NEED LIST**

Reclamation Districts

Reclamation districts reclaim and protect any body of swampland and overflowed salt marsh, tidelands, or other lands subject to overflow, and irrigate lands inside or outside these districts. Services include drainage, levee maintenance, and irrigation.

- **NEED LIST**

Placer County Resource Conservation Districts

Resource conservation districts address a wide variety of conservation issues such as forest fuel management, water and air quality, wildlife habitat restoration, soil erosion control, conservation education, and much more.

- NEED LIST

Placer County Water Districts (California)

Water districts' powers may include the acquisition and operation of works for the production, storage, transmission, and distribution of water for irrigation, domestic, industrial, and municipal purposes as well as any related drainage or reclamation works.

- NEED LIST

Placer County Water Districts (County)

County water districts furnish imported water.

- NEED LIST

Fire Safe Councils

Local Fire Safe Councils assist in educating Californians to protect their homes, communities, and environments from wildfire. These councils serve as forums for stakeholders to share and validate fire safety and fire planning information. There are four active Fire Safe Councils in Placer County:

- Alpine Meadows Fire Safe Council;
- Foresthill/Iowa Hill Fire Safe Council;
- Greater Auburn Area Fire Safe Council; and
- Placer Sierra Fire Safe Council.

State and Federal Programs

A number of state and federal programs exist to provide technical and financial assistance to local communities for hazard mitigation. Some of the primary agencies/departments that are closely involved with local governments in the administration of these programs include:

- California Emergency Management Agency;
- State of California Multi-Hazard Mitigation Plan;
- California Department of Water Resources;
- Department of Forestry and Fire Protection;*
- California Environmental Protection Agency;
- California Department of Fish and Game;*

- California State Parks and Recreation Department*
- California State Lands Commission;*
- Federal Emergency Management Agency (Region IX);
- U.S. Army Corps of Engineers;*
- Bureau of Reclamation;*
- USDA Forest Service;*
- National Parks Service;*
- USDA Natural Resources Conservation Service;*
- U.S. Environmental Protection Agency (Region IX); and
- American Red Cross.

*Owns and/or manages land and/or facilities (or has some sort of administrative role, e.g., fire protection) in the County; potential partner for mitigation activities

4.4.2 Placer County Administrative/Technical Mitigation Capabilities

Table 4.58 identifies the County personnel responsible for activities related to mitigation and loss prevention in Placer County.

Table 4.58. Administrative and Technical Mitigation Capabilities

Personnel Resources	Yes/No	Department/Position
Planner/engineer with knowledge of land development/land management practices	Y	CDRA Engineering and Surveying; Planning Director
Engineer/professional trained in construction practices related to buildings and/or infrastructure	Y	Public Works Director
Planner/engineer/scientist with an understanding of natural hazards	Y	Flood Control District Engineer
Personnel skilled in GIS	Y	IT/GIS Department
Full-time building official	Y	Building Director
Floodplain manager	Y	CDRA Engineering and Surveying
Emergency manager	Y	
GIS data—Hazard areas	Y	
GIS data—Critical facilities	Y	
GIS data—Land use	Y	
GIS data—Assessor's data	Y	
Warning Systems/Services (Reverse 911, cable override, outdoor warning signals)		

Source: Placer County

Placer County and Placer Operational Area Emergency Operations Plan

The Placer County Office of Emergency Services (OES) coordinates planning, preparedness, response, and recovery efforts for disasters in unincorporated Placer County. The department coordinates the development and maintenance of the Placer County and Placer Operational Area Emergency Operations Plan, which serves as a guide for the County's response to emergencies/disasters in the unincorporated areas of the Placer County Operational Area, and to coordinate and assist with disaster response in jurisdictions both within and outside of the Placer Operational Area.

Placer County Heat Emergency Action Plan

The Placer County Heat Emergency Action Plan was developed to reduce the incidence of mortality associated with local extreme heat events. The plan describes County operations during heat-related emergencies and provides guidance for County departments and personnel.

4.4.3 Placer County Fiscal Mitigation Capabilities

Table 4.59 identifies financial tools or resources that the County could potentially use to help fund mitigation activities.

Table 4.59. Fiscal Mitigation Capabilities

Financial Resources	Accessible/ Eligible to Use (Yes/No)	Comments
Community Development Block Grants	No	The grants are only used to serve low income households. Grants are competitive, not entitlement.
Capital improvements project funding		
Authority to levy taxes for specific purposes		
Fees for water, sewer, gas, or electric services		
Impact fees for new development	Yes	The county collects several impact fees including: 1) Dry Creek Watershed Flood Control Plan; 2) South Placer Fire District; 3) Development of capital fire protection facilities in the Sunset Industrial area; 4) Capital fire facilities fees for Placer Foothill Consolidated, Loomis Fire Protection District, and Placer County Fire District; and 5) County's Capital Facilities Fee
Incur debt through general obligation bonds		
Incur debt through special tax bonds		
Incur debt through private activities		

Financial Resources	Accessible/ Eligible to Use (Yes/No)	Comments
Withhold spending in hazard prone areas		

Source: Placer County

4.4.4 Mitigation Outreach and Partnerships

Please add info

4.4.5 Other Mitigation Efforts

County Projects - Need New Mitigation Projects for all Hazards. Please provide info to make the following section current from the 2005 plan

The County also has many planned and ongoing projects focused on minimizing future losses associated with identified hazards. Many of these projects are sponsored and implemented by one or more County departments and/or other state and local agencies and organizations. Current projects include those listed below in this section.

Office of Emergency Services Projects

Sheltering in Place

All stakeholders (i.e. county, fire districts/departments, special districts, utility districts, ARC, and the community at large) agreed on the need for emergency shelters. Stakeholders participated in regular meetings (monthly, quarterly, or semi-annually) and drills/exercises (annually or bi-annually) where emergency shelter is discussed as one of the topics. Stakeholders conduct planning meetings or phone/televideo conferences for forecasted/anticipated event such as severe weathers as well as unscheduled events wild land fires, floods, and earthquake. These forums foster education and collaborative efforts amongst the stakeholders and better prepare them to respond to emergency events. Good progress has been made in the initiative over the past several years, although there remains further work to be done. Some of the significant completed work includes:

Western Placer: Development of the Foresthill Divide & Iowa Hill Divide Emergency Plan first published and disseminated by PCOES in August 2006 and updated in January 2009. The primary purpose of the plan is to pre-establish evacuation protocols and pre-identified evacuation routes and sites for the emergency responders, local residents, and general public in case of large wildland fires occurring in the areas. Due to the remote location of the two areas and limited road access, the plan provides a contingency plan for the community. Although the plan does not address shelter in place for the individual residents in their home, it does address a

contingency plan for the communities to shelter in place in pre-identified sites; thereby minimizing risk and danger due to limited road accesses. Furthermore, the plan addresses facilities and supporting resources for each of the pre-identified sites (e.g. food, water, medical, etc.). The plan was recently updated and brief at community meeting in Foresthill in Jan 2009.

Placer County Water Agency (a special district and not a county department/agency) is planning to build a facility in Foresthill in the near future. The agency is working with the county to identify the facility as a potential site for use as an emergency shelter. As such, recommendation is being discussed to enable to facilities to have generators and other supporting resources.

Eastern Placer: The county is working closely with the American Red Cross (ARC) to identify facilities in the North Tahoe area (including Truckee) for use as emergency shelters. Schools in Tahoe City, Kings Beach, and Truckee have been identified and the ARC is planning to conduct on-site assessments of the facilities for suitability as emergency shelters. Additionally, the ARC has fielded three trailers in the areas with each trailer containing 50 cots, blankets, pillows, and a generator to support each shelter.

The county is planning to build a government facility in the North Tahoe area in the future. Discussion are underway to designate the facility as an emergency shelter, equipped with generators and supporting resources.

NIMS Compliance

The Board of Supervisors officially adopted NIMS Compliance requirement for the County in Oct 2006, which makes Placer County in compliance with federal guidance. PCOES also participated in annual NIMSCAST to update progress. The county has adopted and has used ICS since the late 1990s. As ICS is a core component of the NIMS compliance this contributed significantly to meeting the requirement.

WebEOC Upgrades

WebEOC has been in place in the County since ??? It is primarily utilized as ????. Please expand on what this is and how it is used. A major upgrade is scheduled for April 2009 to version 7.0

Public Utilities Mitigation Measures

Key public (and critical) facilities maintained by the Placer County Facility Services Department include Wastewater Treatment and Solid Waste Disposal facilities. Flooding, severe weather, and earthquakes are the most significant hazards that can adversely impact these facilities. A variety of mitigation measures are currently in place to prevent or minimize the affects of these hazards. Existing mitigation measures include:

- **Mutual aid agreements:** Placer County is working with neighboring jurisdictions to develop a formal mutual aid agreement to provide or receive assistance in and emergency.

-
- **Alarm Systems and Backup Power:** Placer County Wastewater Treatment Plants (WWTPs) and lift stations are equipped with alarm systems to alert appropriate staff of power failures. Additionally WWTPs and lift stations are designed to be operated using generators. Some facilities (including the three largest WWTPs) have dedicated generators on site. The remaining facilities can be operated by portable generators.
 - **Infrastructure Planning/Construction and Utility Location:** Placer County evaluates flood protection levels at the WWTPs when designing and constructing improvements. . In addition, the County has constructed flood walls to protect WWTP facilities in areas within the 100-year floodplain, as required by WWTP NPDES permits. Whenever possible, utilities are located outside of known hazard areas (e.g., landslide areas) to decrease the risk of service disruption.

Flood Control Projects

The County, cities (Auburn, Colfax, Lincoln, Loomis, Rocklin, and Roseville) and the Flood Control District have entered into an Agreement to jointly coordinate the development, support, and operation of the Placer County Flood Control and Water Conservation District. The District was created to provide countywide water conservation; development of water resources; and control and management of drainage, storm, flood, and other waters; and exercise other powers as provided by law. The District was formed as the flood-related problems cannot be economically or efficiently solved through individual actions of existing public entities within Placer County. Placer County and the Placer County Flood Control and Water Conservation District have identified the following projects that have either been completed, are ongoing, or in the planning stage.

Implementation Projects

- Local detention/retention structures to mitigate runoff impacts, associated with new development
- Miners Ravine Off-Channel Detention Basin Project – a multi-objective flood control, creek restoration and public recreation project
- Secret Ravine Multi-objective Floodplain Restoration Sites 1 and 3 (also known as Alternative 4) from the August 2003 feasibility study. (Note that property acquisition would be part of grant request (\$6.5 million))
- Flood Warning System Upgrades – Purchase and installation of additional precipitation and stream level gages; addition of gage adjusted radar capabilities; design, installation and calibration of flood forecasting software.
- Squaw Creek Embankment Reinforcement Project – completed after the 1997 flood to protect future stream erosion and critical sewer infrastructure

Planning Projects

- Detailed re-study, Cross Canal Watershed Flood Control Plan (Update hydrology models, identify regional retention needs, identify critical bridge and culvert replacements, identify potential structure elevation needs, identify potential multi-objective flood control projects)

Placer County Low Intensity Development Program

The Placer County Low Intensity Development Program is designed to minimize impervious surfaces and promote infiltration and evaporation of runoff before it leaves the site of origin, thereby reducing the amount of surface runoff. Low Impact Development also keeps pollutants from contacting runoff which also improves the water quality of surface runoff. Low Impact Development uses decentralized, site- based planning and design strategies to manage the quantity and quality of stormwater runoff. Low Impact Development attempts to reduce the amount of runoff by mimicking the natural (predeveloped) hydrologic function of the site. Landscape features are typically used to work a system to filter, slow, evaporate, and infiltrate surface runoff.

Placer County has received a grant from the Sierra Nevada Conservancy to prepare a set of Low Impact Development Guidelines for Placer County. Examples of Low Impact Development planning techniques include: minimizing paved areas, minimizing soil compaction, preserving natural open space areas including trees and natural drainage channels, clustering of development on compacted soils, and locating open space areas to absorb overflows. The primary audiences for the Guidelines are private and public developers who develop commercial and single-and multi-family residential units. The Guidelines will focus on new, redeveloped, and infill developments.

Placer County Chipper Program

The Placer County Chipper Program is free to all residents of the County, except for Truckee, which is served by the Nevada County Fire Safe Council Chipper Program (also free) since it straddles the County line. The program provides a very cost-effective way for residents to convert large piles of flammable material into small piles of useable biodegradable material. Initially started with funds from a PG&E Settlement after a major wildfire caused by PG&E power lines, subsequent funding was provided as part of a Proposition 204 Grant from the State of California. Funding for the past several years, and for the next few, is coming from a WUI Grant. As with most fire safe projects in the County, the Chipper Program is accomplished through an inter-agency partnership. Funding is administered by the RCD, project management and equipment maintenance are provided by CAL FIRE, and the Placer County Sheriff's Office provides jail inmates for the crews. Over the first seven years of the program that began in 1998, over 17,000 tons of material was chipped. The 2009 forecast will exceed 8,600 tons.

Fire Mitigation Projects

The following list identifies completed and in-process projects led by the Placer County Fire Safe Alliance Partners. This list does not include other agency led projects conducted under separate budgets.

- Auburn Shaded Fuel Break - Private Lands
- Auburn Shaded Fuel Break - Public Lands
- Community education and outreach, including Coffee Klatches and public forums
- Community Wildfire Protection Plan (CWPP) for the western slope of Placer County
- Coordinator for the Placer County Fire Safe Alliance
- Cost-share fuel reduction
- *Defensible Space & Healthy Forest Handbook*
- Defensible Space Inspections 2001-2008
- Demonstration Shaded Fuel Breaks
- Finning Mill Road Shaded Fuel Break
- *Fire & Water* publication in 1998 and 2003
- Fire Wise Construction Workshop
- Foresthill Evacuation Plan
- Foresthill/Iowa Hill Evacuation Routes Map
- GIS Database
- Iowa Hill Fuel Breaks
- Kings Hill Road (Iowa Hill Shaded Fuel Break)
- Legislator and local Government Tour
- Placer County Chipper Program 1998-present
- Propose goals and policies for Strategic Fire Protection and Vegetation Management in the Weimar-Applegate-Colfax Area Municipal Advisory Council (WAC MAC) Community Plan Update
- You and Your Forest: A “How-to” Workbook

The Placer County Fire Safe Alliance team continues to expand its membership and outreach into Placer County and surrounding communities. Neighboring County Fire Safe groups and the National Firewise Communities team regularly attend the Alliance meeting so share “Best Practices.” The Alliance partners also independently work closely together to assist each other with program planning and frequently share resources to achieve regional success.

Although not directly related to Placer County, the value of defensible space and vegetative management is illustrated through the photos below taken of the 2002 Cone Fire occurring in the Blacks Mountain Experimental Forest, where various fuel reduction treatments had been conducted and in the Lassen National Forest, where no fuel treatments had been done.

CONE FIRE IN TREATED AREA



CONE FIRE IN UNTREATED AREA



breaks),

- Vegetation Management;
- Defensible Space;
- Healthy Forest Restoration;
- Response and Evacuation Planning;
- FireWise Construction;
- Firesafe landscapes;
- Fire Education/Community Outreach;
- Fire Safe Freeway; and
- Water Supply.

Community Wildfire Protection Plans

National, state, and local policies have focused efforts on reducing the threat of wildfire, particularly in the wildland urban interface. Community wildfire protection plans assist communities in defining priorities for the protection of assets in the wildland urban interface areas. Currently there are several ongoing efforts to develop these plans within the County. The following CWPPs have been developed for discrete areas within the Placer County planning area:

- Foresthill/Iowa Hill CWPP (2006)
- Tahoe Basin CWPP (September 2006)
- Western Slope of the Sierra Nevada in Placer County (March 2008)

California-Nevada Tahoe Basin Fire Commission Report

The California-Nevada Tahoe Basin Fire Commission was formed in the aftermath of the 2007 Angora Fire which burned 3,000 acres and destroyed 242 homes in the Tahoe area. The report said “the condition of the Basin’s forests represent disasters waiting to happen, with resulting

great loss of the forest, a massive destruction of property, the increasingly high potential for loss of life, and severe and inestimable pollution of the lake.” It also said the current regulatory environment within the Tahoe Basin for removing dead trees, brush, and similar fire hazards is confusing and unnecessarily restrictive. Following the completion of the report, Governor Schwarzenegger declared a state of emergency in Placer and El Dorado Counties to speed up wildfire prevention efforts. The proclamation suspends state contracting rules, to the extent they would prevent, hinder, or impede the removal and disposal of hazardous vegetation. It also authorizes \$100,000 to CAL FIRE to expedite contracts necessary to prepare and respond to emergencies during the fire season. The proclamation also:

- Directs CAL FIRE to inspect property for fire breaks or defensible space, provide public education about defensible space, and impose fines or liens if appropriate;
- Directs CAL FIRE staff to add additional fire engines and other firefighting resources in the area as conditions dictate; and
- Directs state agencies involved with fire fuels management activities in the Lake Tahoe Basin to develop plans for biomass utilization.

Lake Tahoe Basin Wildfire Prevention Activities

Work underway in the Lake Tahoe Basin area to reduce the threat of catastrophic wildfire includes:

- Approximately \$4.4 million derived through the Southern Nevada Public Land Management Act is being used to jump start the efforts of the newly formed Tahoe Fire & Fuels Team. Currently, six projects are in progress to treat nearly 500 acres for fuels reduction purposes.
- Approximately \$1 million of the \$4.4 million in federal funds is being invested in a new defensible space rebate program for private property owners who voluntarily comply with defensible space requirements. Remaining funds will go towards strategic fuel breaks and residential chipping programs.
- A new publication “Living with Fire” has been developed, through the collaboration between Tahoe fire agencies and others, to help homeowners better understand the integration of defensible space and erosion control measures.
- Tahoe Regional Planning Agency regulations have been changed to increase the diameter size of trees property owners may remove without a permit for defensible space purposes from 6-14 inches. Another code change cleared the way for fire agencies to dramatically increase the amount of trained personnel conducting defensible space inspections.
- Placer County has started a hazardous vegetation abatement pilot program in four fire protection districts on the eastern slope aimed at reducing the risk of a major wildfire destroying homes by helping property owners create sufficient defensible space around their buildings. The ordinance will allow the county to intervene where more clearance is needed to obtain the 100 feet of defensible space around a structure as required by state law. The ordinance will require the owner of an adjacent unimproved property to clear sufficient space

to provide for the 100 feet clearance or the county can hire a contractor to do it and add the cost's to the owner's property tax bill.

Vegetation Management Plans

The Placer County Parks and Recreation Division has developed Vegetation Management Plans for Hidden Falls Regional Park and the Squaw Valley Park. These plans are considered working documents and will be updated as necessary based on coordination with local fire officials with responsibilities for these areas.

The intent of treating existing vegetation and fuels now is so that if a fire should occur in any of the County's parks, it would not have enough initial fuel to immediately start burning rapidly outside the park and impact the surrounding properties described above. Fire fighting personnel and equipment would be able to immediately jump on a fire quickly after ignition and contain it before it becomes a major problem. Without pre-treatment of fuels, defensible space practices and shaded fuel breaks, it is debatable if this goal could be achieved. To support the proactive management of fuels in these park areas, the following risk assessments were conducted by the County.

Hidden Falls Park:

- 1) If a fire got started in the eastern portion of the Park and burned northeasterly 3 miles before being stopped about one-half mile west of Highway 49. Assume that Sections 13, 14, 23, and 24 of T13N R7E and Sections 18 and 19 of T13N R8E, MDM would burn:
 - Number of potential parcels of land involved = 273.
 - Acreage potentially involved = 3,301.45 acres.
 - Land value of the 273 parcels = \$29,897,948.
 - Value of Property Improvements on the 273 parcels = \$48,129,069.
- 2) If a fire got started along Coon Creek, inside the Park, and ran north for about a mile, before being stopped. Assume that the land outside the Park in Sections 14, 15, and 16 in T13N R7E, MDM is at risk to burn in such a fire.
 - Number of potential parcels of land involved = 36.
 - Acreage potentially involved = 1579.29 acres.
 - Land value of the 36 parcels = \$4,376,088.
 - Value of property improvements on the 36 parcels = \$934,919.
- 3) If a fire started within the park and burned westerly to Garden Bar Road.
 - Number of potential parcels of land involved = 22.
 - Acreage potentially involved = 313.82 acres.
 - Land value of the 22 parcels = \$2,363,603.
 - Value of property improvements on the 22 parcels = \$2,209,052.
- 4) If a fire burned south out of the Park, for approximately one-half mile.

-
- Number of potential parcels of land involved = 33.
 - Acreage potentially involved = 1272.24 acres.
 - Land value of the 33 parcels = \$8,806,307.
 - Value of property improvements on the 33 parcels = \$3,783,405.

Squaw Valley Park:

- 1) If a fire burned north from the Park to Squaw Valley Road. [does not include the land/improvement values of the Squaw Valley Public Service District building]
 - Number of potential parcels of land involved = 62.
 - Acreage potentially involved = Approximately 6 acres.
 - Land value of the 62 parcels = \$6,767,546.
 - Value of property improvements on the 62 parcels = \$16,509,913.
- 2) If a fire burned out of the Park easterly to Highway 89
 - Number of potential parcels of land involved = 8. [Includes 3 Forest Service parcels].
 - Acreage potentially involved = approximately 18 acres.
 - Land value of the 8 parcels = approximately \$340,934. [value of \$2,000/ac. given to F.S. land].
 - Value of property improvements on the 8 parcels = \$227,370.
- 3) If a fire burned out of the park westerly to Squaw Ridge Road.
 - Number of potential parcels of land involved = 13.
 - Acreage potentially involved = 6 acres.
 - Land value of the 13 parcels = \$1,461,693.
 - Value of property improvements on the 13 parcels = \$3,127,540.
- 4) If a fire burned southerly out of the Park.
 - Number of potential parcels of land involved = 2. [one parcel owned by Washoe Tribe, the other by U.S. Forest Service]
 - Acreage potentially involved = 59 acres.
 - Land value of the 2 parcels = approximately \$206,500. [used \$3,500/ac. value]
 - Value of property improvements on the 2 parcels = \$0.

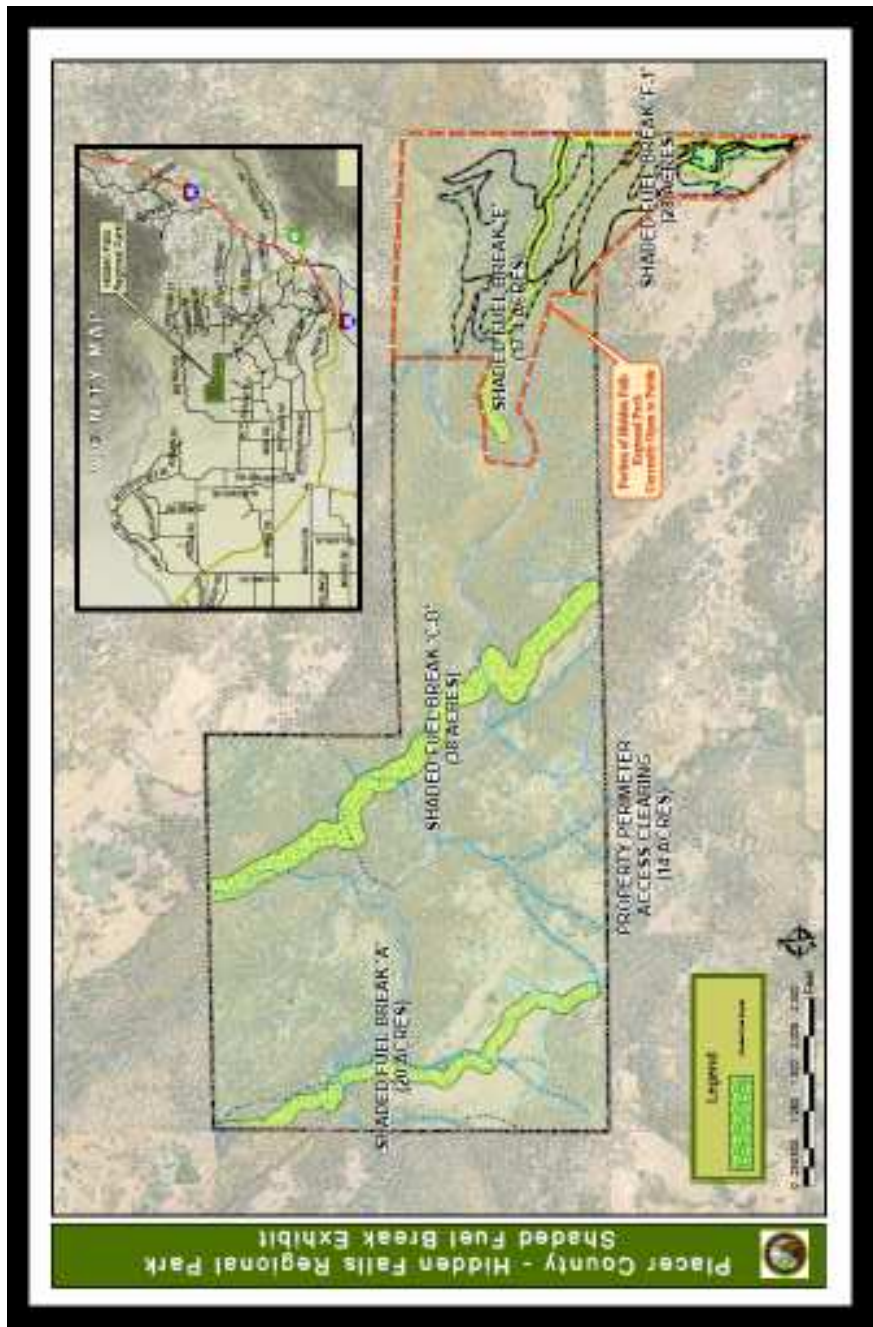
Each of these potential fire scenarios could occur, given past history and current fuel and weather conditions. Not all of them would occur at once, as generally a fire does not burn out in all directions after ignition. Figures 4.49-4.53 illustrate these areas and treatment locations. The photos that follow illustrate these areas and project benefits.

Figure 4.49. Squaw Valley Fuels Treatment, 2008



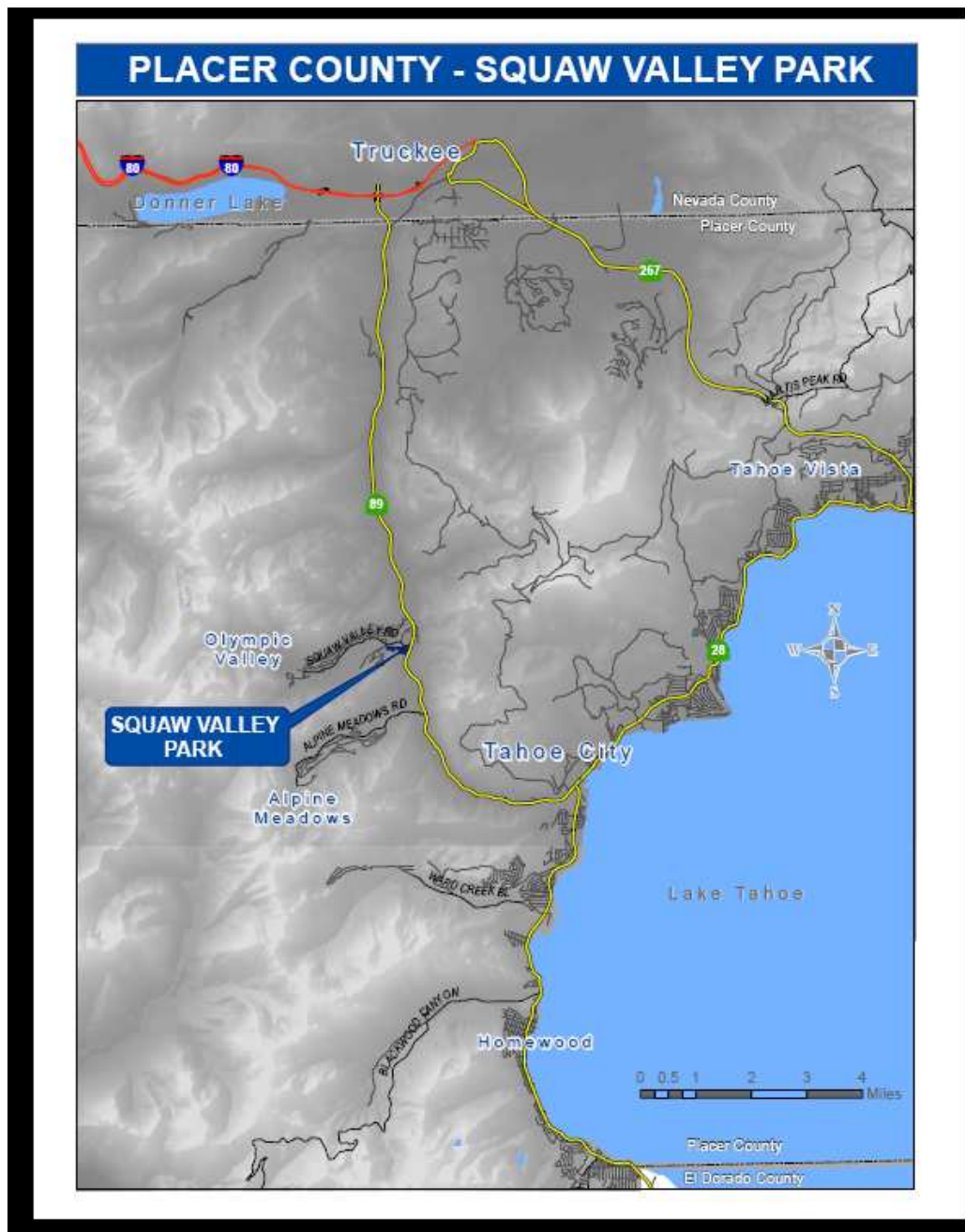
Source: Photo Courtesy of Placer County Parks

Figure 4.50 Placer County – Hidden Falls Regional Park Shaded Fuel Break



Source needed

Figure 4.51 Placer County – Squaw Valley Park



Source needed

Figure 4.52 Hidden Falls: Conservation Corps working on Shaded Fuel Break, 2008



Source: Photo Courtesy of Placer County Parks & Recreation Division

Weed Management Project for Placer and Nevada Counties.

The Nevada/Placer Weed Management Group, led by the Placer County Agriculture Department, began working of various noxious weed abatement activities in 2000. Under AM1168 and SB1740 the group has undertaken the following projects:

- Printed a brochure of the top twelve weeds of the counties;
- Mapped all known infestations of A, B, and Q rated weeds in Nevada and Placer Counties;
- Worked to eradicate known A, B, and Q rated weed infestations in Nevada and Placer Counties;
- Worked to establish a defined leading edge containment zone for Yellow Starthistle on the western slope of the Sierras;
- Conducted a cost-share program with private landowners for Yellow Starthistle;
- Held a yearly weed-pull day to eliminate Musk Thistle from USFS lands; and
- Developed an educational display board that is periodically loaned out to local schools and other groups.

Other cooperative projects completed by the Nevada/Placer Weed Management Area:

- Each County Agricultural Commission carries out a comprehensive weed detection and eradication program on behalf of the whole county;
- The Nevada/Placer WMA in cooperation with USFS-Tahoe National Forest has actively worked to eradicate populations of Musk Thistle in the Truckee area;
- Presentations have been made to the County Board of Supervisors;
- Cooperated with CDFA to distribute Yellow Starthistle Rust bio control trials;
- Cooperated with CDFA staff to detect and eradicate populations of A rated weeds; and
- Participated in Truckee River Cleanup day including hand removal of Musk Thistle.

Other group projects being pursued by group for 2008 under a weed grant program:

- Eradication of isolated populations of A and B rated weeds from Placer County;
- Dry Creek Watershed Red Sesbania Control;
- Eradication of A and B rated weeds in the Truckee River Basin in Nevada County; and
- Eradication of exotic weed species in California State Park units.